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ABOUT THE COVER

The stylized representation of the 1776 flag is a timely design theme in keeping with the spirit of our nation's bicentennial year

The mission of the *U.S. ARMY AVIATION DIGEST* is to provide information of an operational or functional nature concerning safety and aircraft accident prevention, training, maintenance, operations, research and development, aviation medicine and other related data.

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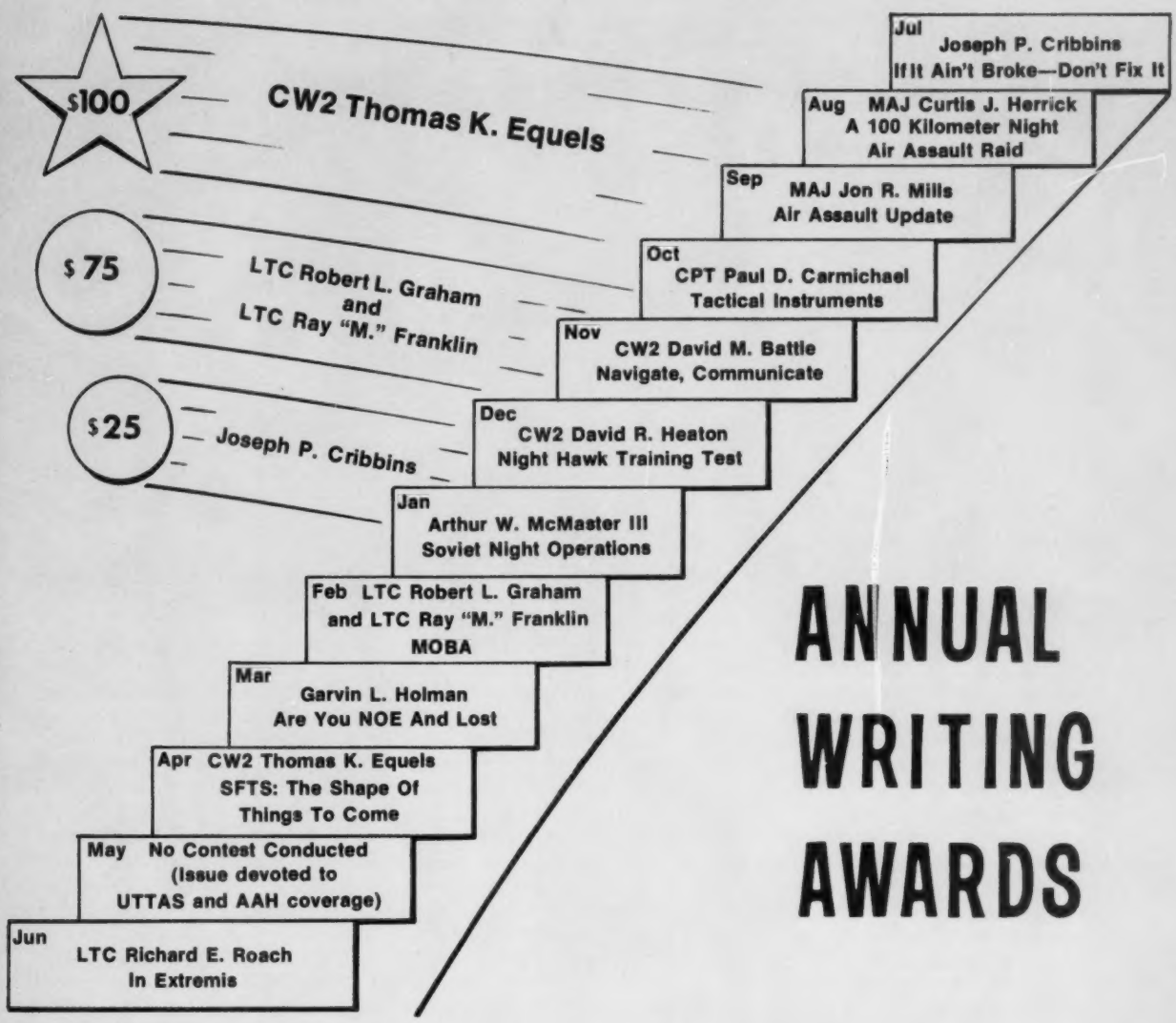

ANNUAL WRITING AWARDS

YOU COULD BE a winner if you submit an article to the *AVIATION DIGEST'S* sixteenth annual writing contest beginning this month. Each monthly winner will receive a certificate. Cash awards will not be made this year.

A person who does not place first will receive a certificate signifying that he or she has had an article published in the *DIGEST*. All authors receive credit in their 201 or appropriate civilian personnel files.

Three annual winners will be selected from the monthly first place winners. First, second and third place certificates will be awarded these winners.

To be eligible for publication in the *DIGEST*, an article must be original and concern Army aviation or related subjects. Winning articles are selected by judges who review the manuscripts without bylines. Selection is based on accuracy, completeness, originality, readibility, soundness, substance and overall merit.

Authors should include pictures, diagrams or charts available or necessary to illustrate manuscripts. Your articles should be submitted to Editor, *U.S. ARMY AVIATION DIGEST*, P.O. Drawer P, Fort Rucker, AL 36362.

Training

Points The Way

Lieutenant General Robert M. Shoemaker

Commander III Corps and Fort Hood

THIS BICENTENNIAL year is an exciting time to be in the Army. In fact these times are particularly exciting times for the aviator. While the whole Army is stimulated by the experience of rethinking its post-Vietnam role, doctine, organizations, equipment and training methods, the aviator's part of this process is as controversial and perhaps less understood than any other.

As we think about the role of Army aviation in modern mechanized combat from our base of experience gained in the Republic of Vietnam, a host of important questions arise. Rather than listing a series of detailed questions, let us note that the ancient issues of survivability, 24-hour all weather capability, and cost effectiveness compared with surface systems still drive the aviation debate. My purpose is not to argue whether we should have more or less aviation, or whether our aircraft should be kept simple or made more capable (hence more complex and costly), or to show how our doctrine or organizations should be refined. My aim is simply to point out that good training on a daily basis is the best thing we can do to ensure that the Army comes up with the right answers to those key questions.

Aviation elements, like the rest of the Army, must train to beat our potential enemies on the kind of battlefield over which we are likely to have to fight. While we still have much to learn about the threat, it seems clear that our flight tactics must achieve two conditions. First, when closer than 3 kilometers to enemy air defense guns or missiles, our aircraft should never be exposed to them for more than about 30 seconds. Second, at ranges greater than 3 kilometers, our aircraft must avoid giving away the location of any friendly unit or facility which could become the target of indirect or aerial fire. This can be done by flying in optical and radar defilade, or by avoiding patterns of flight which would reveal to enemy radar the location of helicopter landings. Of course suppression by friendly smoke or fire is an important tactic which can make temporary but very important changes to enemy capabilities.

All aviation tactical training should be designed to develop and hone the tactics and procedures to permit continuous and routine achievement of the two conditions just described. Much more is involved than individual and crew training. All Army commanders of Armor, Infantry, Artillery, Aviation or other supporting units must understand, believe and train their units in these conditions for survivable aircraft operations. Whatever task we want undertaken by aviation must be possible without the aircraft being destroyed and without pinpointing friendly units for attack by enemy fire.

These following are a few examples of the kinds of aviation training about which we must be serious:

Adjustment of artillery fire—This is where Army aviation began. Today's aerial observer will survive only if he habitually trains in and perfects the "hide and pop-up" technique. That is, the LOH (light observation helicopter) will remain in defilade and quickly pop up to an altitude of 50 feet or more timed to coincide with the burst of the round. After observation of the burst, the helicopter will drop back into defilade, move several hundred meters and prepare to pop up for a subsequent look. The observer's transmissions and calculations are performed while the LOH is moving back to or into a hidden position. This should be the standard and usually the only acceptable way to use the LOH for artillery observation. *Is your division artillery trained?*

On the modern battlefield, division and brigade commanders often will find the helicopter affords the best means to get around to visit their subordinates; to view the battlefield; and from which to communicate. When using the helicopter as an OP (observation post) the observation technique will

. . .more than half the time the battlefield is going to be darkened or obscured. . .But the war will go on. . .There is no substitute for training at night

be similar to the pop-ups of the artillery observer. When visiting subordinate units, the helicopter must avoid enemy radar or optical observation at the point of landing. Crews of division aviation companies and brigade flight sections must know the areas where enemy radar and ground observers might be emplaced, and fly in the resulting shadows. They must be able to fly down creek beds to get to a battalion CP (command post) without being seen. The command helicopter must behave like a scout when moving around the forward battalion areas. Commanders must always stay oriented and be trained to specify altitudes as well as ground track when directing their pilots. *Are your command flight sections trained? and your commanders?*

The tactics for air cavalry and attack helicopters seem to be well understood. Much good training is underway. The new gunnery programs set forth in TC 17-17 are a giant step forward. But much remains to be done. Commanders of tank and mechanized infantry battalions should know how to use an attack helicopter platoon with full effectiveness. They should practice often in order to develop the teamwork necessary to integrate ground observers and aerial scouts with tanks; ground TOW; and Cobra TOW (tube-launched, optically-tracked, wire-guided missiles). These are complex matters—the military art today demands of its leaders a much higher level of skill than in the past. Practice through realistic training is the only way to get there. *Do your armored and mechanized battalions train regularly with attack helicopters?*

A major challenge of modern combat will be keeping surface routes open. We know that bridges will be blown, roads jammed with civilians, vehicles and routes will be blocked by craters, dead vehicles and debris. We can expect greater not lesser, demands on our medium and heavy lift helicopters to move critical supplies and replacement equipment. The Chinook bringing a resupply of TOW missiles to a unit at the critical area, or bringing ammunition up for the artillery battalion whose trucks can't get through, must fly tactically in the forward area just as do scout and command helicopters. Chinook crews must learn to fly with their sling loads just clearing surface obstacles by a few meters—but never, never permitting their loads to collide with trees or wires. When in the division area, they must learn to fly along stream lines and draws to stay hidden from enemy radar or optics. Because of the need to stay low, there will be some critical missions in which internal loads only can be used. Crews and commanders must be trained to quickly analyze the tradeoffs to decide whether internal or sling loads should be used. *Are your commanders, logistical staffs and CH-47 crews trained and practiced in this vital business?*

Somewhat more than half the time the battlefield is going to be darkened or obscured to some degree by night or adverse weather But the war will go on. Army aviation units of all types have to train under these conditions so that aviators and their commanders will know what they can do and also

Continued on page 17

Guatemala

210th Aviation Battalion Comes Through Again In Disaster Relief

CW2 Larry R. Santure
114th Aviation Company, 210th Aviation Battalion
Fort Clayton, Canal Zone

PROVIDING RESPONSIVE airlift support for disaster relief assistance to Latin American countries is a primary mission of the 210th Aviation Battalion, the aviation element of the 193rd Infantry Brigade (Canal Zone). Just 16 months after providing such support to Honduras following the disastrous Hurricane Fifi, the battalion again received the call—this time to assist in one of the worst natural disasters in Latin American history.

Before dawn on 4 February 1976, a violent earthquake measuring 7.5 on the Richter scale and lasting about 34 seconds rocked Guatemala, spreading death and destruction virtually across the entire country. Secondary tremors and earthquakes of varying magnitudes continued to add to the devastation throughout February. All told, the disaster left 22,832 dead, 77,060 injured and some 1,200,000 homeless.

Within hours after the first earthquake, the battalion was alerted to prepare for deployment of aircraft to Guatemala. On the afternoon of 5 February, a U-21 aircraft from the 210th's 352nd Aviation Detachment departed the Canal Zone and arrived in Guatemala that evening. For the next two days the U-21 supported the U.S. Southern Command's seven-man Disaster Assistance Survey Team (DAST) with aircraft reconnaissance which revealed widespread destruction to the road and bridge networks and surrounding villages. The DAST quickly determined that helicopters could provide the only means of getting support into the disaster area. The 210th was then tasked to provide the necessary support which was to include performing damage assessment, resupply, medical evacuation and medical team transportation missions.

On 8 February, two UH-1H Huey helicopters from the battalion's 114th Aviation Company were deployed to Guatemala. Even after the 10-hour flight from the Canal Zone, the day was not over for the crewmembers. Relief supplies, doctors, nurses and hundreds of volunteer workers critically needed in the stricken villages were building up at the Guatemala City airport. The pilots began disaster relief support immediately, transporting 2,500 pounds of cargo, completing 9 medical evacuation missions and moving

Looks of despair as parents accompany injured young son to a hospital aboard a 114th helicopter. Right, SP5 John Coffee holds an injured baby girl's hand and strokes her hair aboard a Huey enroute to the 97th Field Hospital

Above, example of widespread destruction to road and bridge networks. Above right, members of the 114th and a WAC medic of the supporting Chinook unit from Ft. Hood transfer a victim from the CH-47 to a Huey enroute to a hospital. Right, local volunteers help UH-1H crewchief load vital food supplies enroute to survivors in outlying areas

13 relief workers to the disaster area before darkness.

The next day four more Hueys and an OH-58 Kiowa arrived from the Canal Zone to assist in reconnaissance missions. Altogether the 114th committed 10 Hueys to the enormous task that lay ahead.

Initially, La Aurora Airport in Guatemala City was used as the staging area for flights to the devastated areas. The air traffic using the single runway at the airport made it an extremely conjested area. Flying into Guatemala City from the devastated countryside required a minimum of one hour turnaround flying time. Upon reaching the airport the aircraft were required to make an extended traffic pattern and then land, shut down and refuel.

CH-47 Chinook helicopters from the 6th Cavalry Brigade (Air Combat), Fort Hood, TX, provided a method of operation that greatly increased efficiency and safety procedures. A rapid refueling point was set up near the center of the disaster area. The Chinooks carried 500-gallon collapsible fuel drums to a hard surface road within 10 miles of Chimaltenango, one of the hardest hit villages. This site also was within minutes of the 47th U.S. Army Field Hospital (brought in from Fort Sill, OK, in a massive airlift by U.S. Air Force C-141 Starlifters and a C-5A Galaxy). The site became a major distribution point for supplies and personnel coming out of Guatemala City.

With this rapid refueling point, the time onstation for the aircraft increased from 90 minutes to approximately 2½ hours. The CH-47s carrying their large cargo were able to set up other distribution points near other villages damaged by the earthquake.

Taking advantage of the new distribution points, the 114th aircrews developed an operation plan that increased the efficiency and speed of the relief effort. The plan, which called for each aircraft to be assigned a specific work area each day, had several advantages. It decreased the amount of flying time wasted on overlapping missions; enabled pilots to become familiar with a particular area of operation; allowed relief supervisory personnel in that area to better coordinate missions; and provided invaluable information as to damage, casualties, food and water needs in that area.

San Martin, a village where more than 2,000 were reportedly killed, was the site of a major distribution and collection center. CW2 Wayne Milbauer, a pilot in the 114th who had logged in excess of 60 hours in support of that area, said *"It was incredible. I have never seen such destruction, even in Vietnam. Wherever we landed, people came running up to the helicopter. They were always orderly but we could tell they were hungry or looking for water. It was pretty disheartening because we were primarily looking for casualties those first few days. Later when we were able to fly in the supplies, the smiles we received were enough reward to keep us going forever."*

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The people of the United States still have a common goal with the founding fathers; to hold out the hand of friendship and assistance to our fellowman

IN THE WAKE of the disastrous Guatamalan earthquake on 4 February 1976, as reported by CW2 Larry Santure in his article on page 4, the 6th Cav was alerted to lend assistance to the people of Guatemala.

The "D" Company (Wagonmasters) of the 34th Support Battalion, 6th Cavalry Brigade (Air Combat), the CH-47 Chinook helicopter unit in support of Ft. Hood, TX, and the unit whose personnel constituted more than half of the total contingent, immediately began putting the finishing touches on their preparation to depart for Guatemala.

At six minutes after nine on 7 February, slightly more than 7 hours after official notification, a

Continued on page 22

OPERATION WAGONMASTER

Major Terry N. Rosser

Along with the destruction and mud slides, high winds, dust and continuing tremors made the operation difficult. In spite of these problems the helicopters managed to bring in supplies and equipment to help

In recognition of the Bicentennial, the *DIGEST* is publishing three new chapters of The Army Aviation Story. This is the second of these articles. The first was "The Army Aviation Story, Part X: The Early 1960s," which appeared last month. Part XII will appear in August

The Army Aviation Story Part XI: The Mid–1960s

Major David H. Price

BY EARLY 1965 the Army of the Republic of Vietnam (ARVN) was being beaten on the battlefield. More American assistance was needed to stave off defeat—specifically ground combat troops. Intelligence reports held that the Vietcong and their North Vietnamese allies would attempt to cut the Republic of Vietnam in two at its narrow waist in the central highlands. If airmobility enthusiasts were right, could not this threat be thwarted by a fast-moving, hard-hitting force?

In March 1965 the decision was made to send the 11th Air Assault Division (T) into combat under the colors of the 1st Cavalry Division (Airmobile). The advance party of the "First Team" arrived at An Khe in the central highlands of Vietnam in August 1965.

By November 1965 the 1st Cav was locked in heavy combat in the central highlands southwest of Pleiku near the Cambodian border at a place called the Ia Drang Valley.[1] The enemy was aggressive, determined, disciplined and fought fanatically for 35 days. Many of their I.D. cards had been issued in Hanoi.

Ia Drang was a dramatic victory for the "First Team." During the battle, the division's aircraft hauled 5,048 tons of cargo to the troops in the field; in addition, 8,216 tons were transported from seacoast depots to tactical resupply points, all by the division's organic aircraft. Whole infantry and artillery battalions were lifted by helicopter into, around and out of the battle area. About 2,700 refugees were flown by helicopter to safety. With all this, only 59 aircraft were hit by ground fire and only four were shot down. General William C. Westmoreland, then commanding all U.S. forces in Vietnam, had this to say about the victory at Ia Drang: "The ability of the Americans to meet and defeat the best troops the enemy could put on the field of battle was once more demonstrated beyond any possible doubt, as was the validity of the Army's airmobile concept."

At this point in The Army Aviation Story it is appropriate to temporarily depart from the chronological approach to discuss the general nature of the airmobile concept and to glance at the evolution of the armed or attack helicopter because without the helicopter gunship, the airmobile concept could not have progressed as it did.

The Nature of Airmobility: Think about the term "organic aviation." In World War II, aerial artillery adjustment was performed by observation squadrons centralized at the corps level. In other words, the airplanes were commanded and controlled at least three echelons of command higher than the firing battery. Thus, the observation squadrons were organic to the corps but not to the firing battery. Lieutenant General C.W.G. Rich, director of the 11th Air Assault Division tests,[2] articulated the concept of increasingly responsive and effective airmobile support in the following statement:

> I wish to distinguish between three fundamental levels of airmobility. *First*, an aviation unit can be given to a combat force on a temporary basis for a specific operation. This is equivalent to a corps truck company attached to a division for a one-time move. Such an operation involves two separate staffs working out detailed plans to integrate the SOPs and techniques of two separately trained organizations. *The second level* is represented by the organic aviation in an Infantry Division. This approach benefits from unity of command, day-to-day training and intangibles such as esprit. But it is limited to a company lift capability; it does not permit replacement of ground vehicles by aircraft; its equipment is not tailored to aircraft capabilities; and it could never represent the primary thrust of the division. *At the third level* a much greater gain is possible when the organization is specifically trained and equipped to exploit the continuing close tactical integration of heliborne lift as a primary means of maneuver, accompanied by readily available aerial fires and by highly responsive aerial reconnaissance and support systems. In my opinion, the combat power offered at these three levels rises on a geometric, rather than an arithmetic scale, and only at the third level do we find a new potential in the tempo of operations, in range over extended distances and in freedom from heretofore formidable terrain obstacles.

General Rich makes the point that only at the third level does the potential for drastically changing the "tempo of operations" lie. Effective support, indeed sometimes the most cost-effective aviation support, can be rendered under conditions properly described as first or second level. Such was the case in Vietnam with the 1st Aviation Brigade to which all non-divisional Army aviation was assigned.

At its peak during the Vietnam years, the 1st Aviation Brigade[3] comprised the largest single Army aviation command in the world. The philosophy of support begun in the early years of the Vietnam conflict continued under the Brigade. For example, in the Brigade's 164th Combat Aviation Group, which operated in the Mekong Delta, each of the three aviation battalion commanders went daily to the ARVN division headquarters that they supported in order to ensure that the thrust of their effort was

forward—toward the Infantryman who relied on the helicopter for support. This same philosophy of support permeated the 1st Aviation Brigade, whether support was being rendered to U.S., ARVN or allied troops.

The Brigade was effective. Lieutenant General John J. Tolson III recounts its accomplishments during calendar year 1967:

> [The 1st Aviation Brigade] airlifted more than 5 million troops—the equivalent of 313 Infantry divisions . . . Brigade aircraft flew more than 1.2 million hours, the equivalent of 137 years. The Brigade was credited with killing 10,556 Vietcong, sinking nearly 10,000 supply sampans and destroying more than 10,400 enemy structures and fortifications.

General Creighton Abrams, as commander of U.S. Forces in Vietnam, paid the highest tribute to the 1st Aviation Brigade on behalf of the ground combat Soldiers:

> It has always been interesting to me to note that the aviators and men of this Brigade have been taken into the brotherhood of the combat arms. Not by regulation, not by politics, but they have been voted in by the Infantry . . . the charter members of that secluded club, the combat arms.

General Rich's third level of airmobility has been best exemplified in the 1st Cavalry Division (Airmobile) and in the 101st Airborne Division (Air Assault). General Tolson, a former commander of the 1st Cavalry Division in Vietnam, offers this astute observation on the advantages of the airmobile division:

> The tactical advantages of the airmobile division can be summed up as follows: increased efficiency due to the repeated association of units; thorough integration of its assets because of close association and command relationships; and the ability to take a different conceptual approach because of its assured assets. The impact of organizational and command relationships has a direct and distinct impact on the quality of support. There is no denying that general support units rarely tend to identify closely with the supported unit, at least not as closely as organic units. This is a simple truism of human nature.
>
> The epitome of "superior" airmobile tactics, as contrasted with "good," is the capability to exploit not only an opportunity but the trends and changing patterns in enemy activity. This requires a flexibility which is much more difficult to initiate and accomplish when non-divisional units are involved. This is particularly true of air cavalry. More than any other unit, the air cavalry development in Vietnam has proven the need for quick reaction to meet the demands of the situation as seen by the commander on the scene. Adaptation to a change in environment is more feasible and more likely when the unit is organic.
>
> The airmobile division commander is able to plan a complete campaign based on airmobility as opposed to a campaign which, as an incidental element, employs airmobile assets in some of its battle plans. As a corollary, I know of no other major organization besides the airmobile division [in which] the commander is willing to consistently commit all his forces on a day-to-day basis; that is, not keep the traditional reserve. The airmobile division commander *knows* that he can extract a reserve out of *his* deployed units as needed because he has the assets and the training to do so. This is a major economy of force.
>
> By changing our perspective from that of the division commander to the individual Soldier, we can perceive one of the often forgotten advantages of airmobility. It is ironic to me, after the millions spent to reduce a few pounds from the Infantryman's rifle, that many Soldiers would end up carrying as much (or more) total weight as the doughboy of World War I. A Soldier, when he exits a helicopter, becomes the Army's most important extension of the airmobile concept; and his individual load should consist of the bare essentials needed for the next few hours—basically ammunition and water. To avoid the classic Soldier's syndrome of holding onto everything he owns, the 1st Cavalry Division developed a technique for keeping all the personal equipment of the individual in squad bundles that were consistently delivered when needed. This was a tremendous boost to morale as well as a very real increase in effectiveness. However, this seemingly simple technique has to be relearned several times in every campaign.
>
> When the terrain and circumstances permit, armor and airmobility complement each other in a natural way to form an unbeatable team. Airmobility gives the commander unique capabilities in reconnaissance, maneuver and logistics while the armor gives the shock and firepower which have characterized it in the past. Air cavalry and airmobile infantry can find and fix the enemy so that armored and mechanized forces can be brought in at the decisive moment to finish him.

Prior to the arrival of the UTT, lift helicopters were escorted by B-26 and T-28 aircraft

The Armed Helicopter: The development of the armed or attack helicopter was essential to the growth, and indeed the survival, of the airmobile concept.[4] The U.S. Army Aviation School at Ft. Rucker, AL, had sponsored several basic tests of various helicopter and weapon mixes in the 1950s and in the early 1960s conducted a regular course for selected student aviators. The "Tactics" or "Tiger" Course as

it was called, included both what was known of aerial gunnery at that time and nap-of-the-earth flying. The Tactics Course was begun in 1962 and furnished many of the first trained armed helicopter aviators in Vietnam. Though the Tactics Course was deleted from the curriculum in 1964, the trend toward the widespread Army use of armed helicopters continued its enthusiastic growth in the combat zone.

The Utility Tactical Transport Helicopter Company (UTT) fielded some 20 armed UH-1 Hueys in Vietnam combat in 1962. The weapons used were twin .30 caliber ground-type machineguns and 2.75 inch rockets. They were attached to the aircraft by makeshift, locally fabricated mounts.

The UTT mission was to provide armed escort to the unprotected columns of lift helicopters which carried the Infantry into battle. Suppressive fire was delivered on enemy targets during the flight to the landing zone and during landing. The rules of engagement varied from time to time with changes in ARVN leadership. At first, armed helicopter crews could not fire unless fired upon. But, as the war wore on, the rules of engagement were relaxed.

Prior to the arrival of the UTT, lift helicopters were escorted by B-26 and T-28 aircraft. After the armed helicopters assumed the escort role, the number of lift helicopters hit by ground fire dropped drastically. Soon each separate lift company had 7 to 10 armed Hueys organic, to provide its own escort and suppressive fire support.

Armed helicopter teams could linger in the battle area after the lift ships had departed the landing zone. Because they flew so low and slow, with four pairs of eyes in each aircraft, the armed helicopter crewmen soon became noted for their ability to spot and kill the enemy quickly and efficiently. ARVN commanders and their U.S. advisors began to use the gunships in place of artillery. The role of "over-the-shoulder" aerial fire support of ground units developed almost overnight. Often the Infantry did not detect the enemy until the distances between the two were 10 or 20 meters (sometimes less). The advisor would hesitate to call artillery or fighter-bombers for fear of hitting his own men. The armed helicopters were able to place deadly fires on the enemy even though he was very close to friendly troops. Therefore, the helicopter gunship filled the gap between the infantry unit and the other traditional forms of fire support. Aerial fire support from armed helicopters soon became a vital part of every ground commander's operational schemes.

The armed UH-1 was slow and its ammunition capacity was limited. Also, if the armed Huey left the lift formation to suppress ground fire enroute to the landing zone, it could never catch up in order to be in position to support the critical landing phase. A faster, more maneuverable gun platform was required. That turned out to be the AH-1G HueyCobra attack helicopter.

The AH-1G HueyCobra is a faster, more maneuverable gun platform than the UH-1

The Cobra proved its worth time and again, from its introduction in 1967 to the end of the U.S. presence in Vietnam. It was fast and deadly, and in addition to machineguns and rockets, the Cobra could launch a variety of 20 and 40 mm ordnance with devastating accuracy. During LAMSON 719, the incursion into Laos in 1971, the Cobra proved it could survive in a high threat antiaircraft environment. Not only could it survive, it could kill tanks. The implications of the attack helicopter for future battlefields, in a European environment for example, were indeed thought-provoking.

Next Month: Part XII, The Late 1960s

For Additional Information See Previous Issues Of The ***DIGEST:***

[1] "1st Cav Div (Airmobile)," August 1965, Inside Back Cover; "Over The Beach," April 1966, page 18; "Airmobile Firepower—Hallmark Of The 1st Cavalry Division," March 1967, page 19; "Ride A Slick Ship," June 1966, page 23; and "Highway Mission—Airmobile Style," November 1968, page 2.

[2] "The Army Aviation Story, Part X," June 1976, page 4.

[3] "Hawk Colors Flying At Fort Rucker," May 1973, Inside Back Cover.

[4] "We Armed The Helicopter," June 1971, page 2 and "The Armed Helicopter Story Parts I through VI," July through December 1971.

Soviet Air Transportation—

Projection Of Power

Captain Terry L. Schott
Evaluation and Test Directorate
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THE ABILITY OF a militarily powerful nation to exert its influence abroad depends in part upon its capability to deploy troops and equipment. The most rapid means for this deployment is by strategic aircraft. The Soviet Union maintains an extensive inventory of the materiel required for this strategic aerial delivery.

Russia was one of the first nations to recognize the importance of air transportation. A quick look at a map and a history book will

Left, paratroopers descending stabilized. The three stage personnel chute consists of the stabilizing chute; main canopy cover (sleeve); and the main canopy. Below, air-dropping Soviet paratroopers during a major exercise

Soviet IL-76 Candid recently entered service. The turbojet is similar to our C-141 Starlifter. Below, heavy cargo landing with three 20-meter diameter chutes clustered. Air bags cushion ground impact

show why. A trip to the map shows a country which covers a vast territory, much of which is not readily accessible by land or water. The history book reminds us that at the beginning of the 20th century the means of communication in Russia were in a primitive state. The development of telecommunication and road and rail networks posed extreme problems for Russian planners. The airplane was seen as one means of overcoming these formidable problems. Nevertheless the Soviets have developed a very extensive and modern rail network on which they now depend for long distance moves within Eurasia.

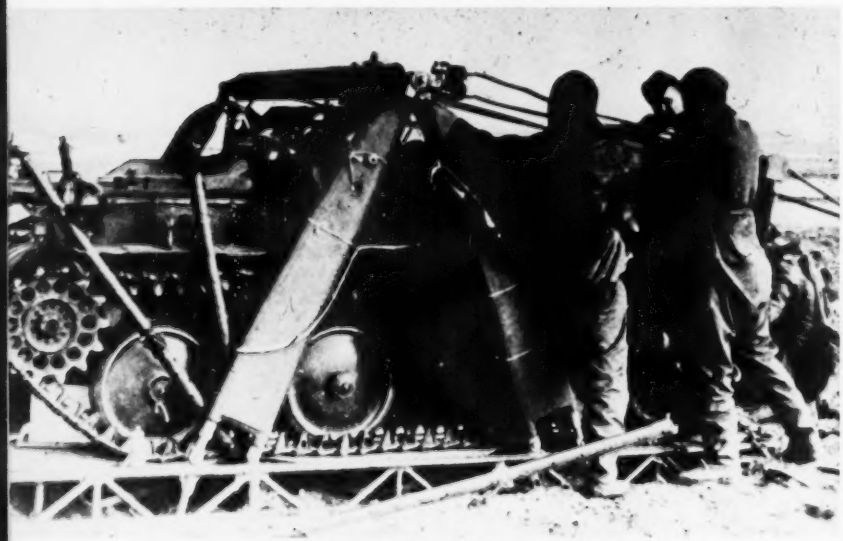
Despite the early interest in aircraft, the onset of World War II found the Soviet Union without a viable air delivery capability. Throughout the war the Soviets greatly admired the air transportation capabilities of the Americans and the British. Following the war the Soviets used the wartime experience and information gleaned from lend-lease aircraft to make great strides toward creating a strong air arm for their forces. The nation's industry concentrated heavily on the development and production of fighter aircraft.

The death of Joseph Stalin and the close of the Korean War introduced a new era in the Union of Soviet Socialist Republics (USSR). One result of this period was the development of aircraft for civil aviation and military logistics. During the late 1950s the Western world was surprised on numerous occasions by the rapid advancement of Soviet air transportation.

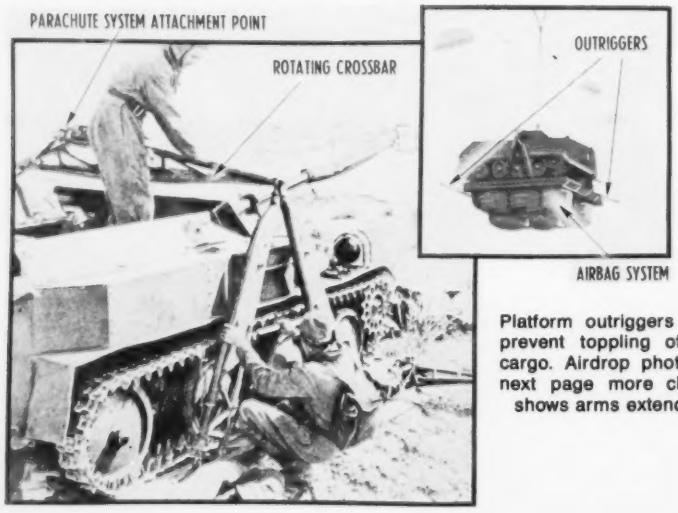
While Aeroflot, the Soviet national civil airline may be the world's largest airline, VTA (Soviet Military Air Transportation) even with its reserve augmentation from Aeroflot does not have more airlift assets than the USAF, active and reserve plus its augmentation under the Civil Reserve Air Fleet (CRAF). Certainly the number of aircraft alone is not a good measure of capability; a weighted index considering payload and range is more meaningful. In this regard the U.S. military airlift capability clearly exceeds that of the Soviets.

In recent years the VTA has clearly demonstrated its ability to support the global policies of the Soviet government. Air transportation was a vital element in the 1968 invasion of Czechoslovakia. It figured significantly in the support given to the Arab countries, par-

Light airborne assault gun, ASU-57, is driven onto platform for transport by AN-12 Cub. The turboprop is the backbone of the VTA fleet. Below the ASU-57 is derigged after airdrop



Features Of Heavy Drop Platform



Platform outriggers help prevent toppling of the cargo. Airdrop photo on next page more clearly shows arms extended

ticularly during the 1967 and 1973 Mideast Wars. It should be noted that all Soviet Union military aviation assets are invested in the VTA and that the Soviet army itself has no air transportation nor combat capability.

The backbone of the VTA fleet is the AN-12 Cub which was introduced in 1959. The Cub, with its four turboprop engines, is capable of transporting more than 44,000 pounds of cargo. It has a range of 2,100 miles and a cruising speed of 360 miles per hour; however, with maximum payload the range is considerably less than cited. For heavy transport, the Soviets rely upon their AN-22 Cock which was introduced in 1967. With a cargo capacity that exceeds 176,000 pounds, this aircraft is second in size only to the U.S. giant C-5A. Maximum fuel gives the AN-22 a range of 6,800 miles but as with the Cub, range is far less carrying the maximum load. The four turboprop engines of the AN-22 allow a cruising speed of nearly 400 miles per hour.

Not all developments have been made with turboprop engines. The IL-76 Candid which is just entering service is a turbojet which is very similar to the U.S. C-141 Starlifter. The Candid, with a cruising speed of 560 miles per hour, is easily adaptable to the performance of a military role.

A consideration that deserves mention is that the Soviets do not have an inflight refueling capability. As a result they are dependent on enroute refueling bases and over-flight agreements with other nations for intercontinental moves. Only the Candid is a true global lift aircraft and though the Soviets possess a formidable and increasing airlift capability, the U.S. remains number one in strategic airlift and the capability to project power by that mode.

The preferred method for using these aircraft to transport goods is by airlanding. This method re-

quires less preparation of cargo for the transportation and achieves the best results for minimizing damage to the cargo. This method of delivery also permits the aircraft to be used during its return flight.

Equipment to be air transported is prepared for transportation and carefully checked prior to loading. Loading lists are used to achieve maximum efficiency in this operation. Self-propelled vehicles are driven into the cargo compartment by their own power. Other equipment is loaded with the aid of an electrical winch, or if the weight is less than one ton, it may be loaded with manpower. After all of the cargo is loaded, it is secured in place in accordance with diagrammatic specifications. Upon arrival at its destination, cargo is unloaded by the airlifted unit when possible, and by aircraft crews when necessary.

If airlanding is impractical or impossible, cargo may be airdropped. The Soviet Union has developed an extensive airdrop capability. During the last 10 years, the Soviets have introduced numerous air containers, platforms and parachutes.

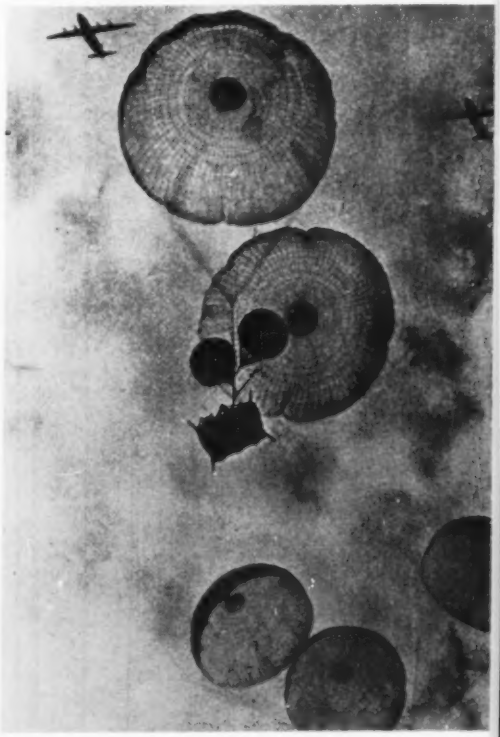
Not all cargo to be dropped from an aircraft requires a parachute. While there has been no particular program aimed at the development of free fall containers, there are reports of an inflatable rubber container being used to drop water bottles without breakage from an altitude of 3,000 feet. Paper honeycomb spheres and other types of inflatable containers also have been the subject of limited experimentation.

The standard method of airdropping continues to be with the use of parachutes. All cargo to be airdropped is marked to facilitate packaging and loading as well as identification at the drop zone. Packages are color coded or stenciled according to content and the center of gravity is clearly marked. If the material is in a closed container, the type of supply also is noted. Fuel is identified by its type (gasoline, diesel, alcohol, etc.) and ammunition is identified by type and caliber.

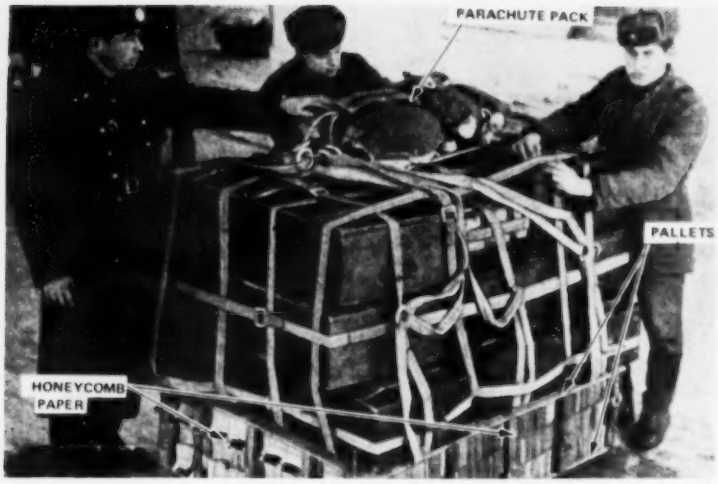
The Soviets employ a wide variety of systems for airdropping cargo. There are, for example, at least 15 light cargo drop systems known to be in use. The P-85 is designed to deliver engineer equipment. This container has a load capacity of about 1,600 pounds. The P-85, with dimensions of 18 by 2 feet, would be for loads such as several boxes of high explosives. The weight of the container, including its two parachutes, is about 900 pounds.

The PDBB-120 is one of the systems used for the delivery of liquids. This all metal container is divided into three sections. The top carries the parachute, the center is a tank for up to 32 gallons of liquid, and the bottom is the shock absorption cushion. The PDMM-44 is a nonrigid container used primarily to deliver equipment such as small arms, ammunition, rations or medical supplies. The container, which can accommodate loads weighing up to 220 pounds, consists of a soft, heavy canvas sack and rigging plates. The sack is comprised of a parachute section, a cargo chamber and a section for shock absorption. The cargo itself is afforded extra protection by the use of packing material which ranges from hay and rags to pine needles. The container itself weighs less than 50 pounds.

One of the most common light to medium weight cargo systems is the PGS-500. This platform



GAZ-69 truck descending with two 20-meter diameter chutes clustered. Below the AN-22 Cock cargo capacity in excess of 176,000 pounds is second only to the giant U.S. C-5A



The PGS-500 medium weight cargo system has skid plates separated by three layers of 4-inch high honeycomb blocks

employs skidboards separated by three layers of 4-inch high paper honeycomb blocks. This platform can be used to drop loads of up to 1,000 pounds. The PGS-500 is particularly useful in that it can be dropped from as high as 26,000 feet at an aircraft speed of 250 miles per hour and still provide full security for its load.

The heavy equipment platforms demonstrate the highest degree of technology. The Soviets use metal load-bearing platforms. That is, the parachute is attached to the platform, not to the cargo. The platform is fitted with inflatable air bags to cushion the landing. Since the uninflated bags do not touch the ground during the loading sequence, vehicles can be driven directly onto the platform. This eliminates the requirement for a crane to lift the vehicle onto the platform. These airbags do tend to decrease stability of the load at the time of impact. In order to overcome this shortcoming, anti-toppling arms or outriggers are placed at each corner of the platform.

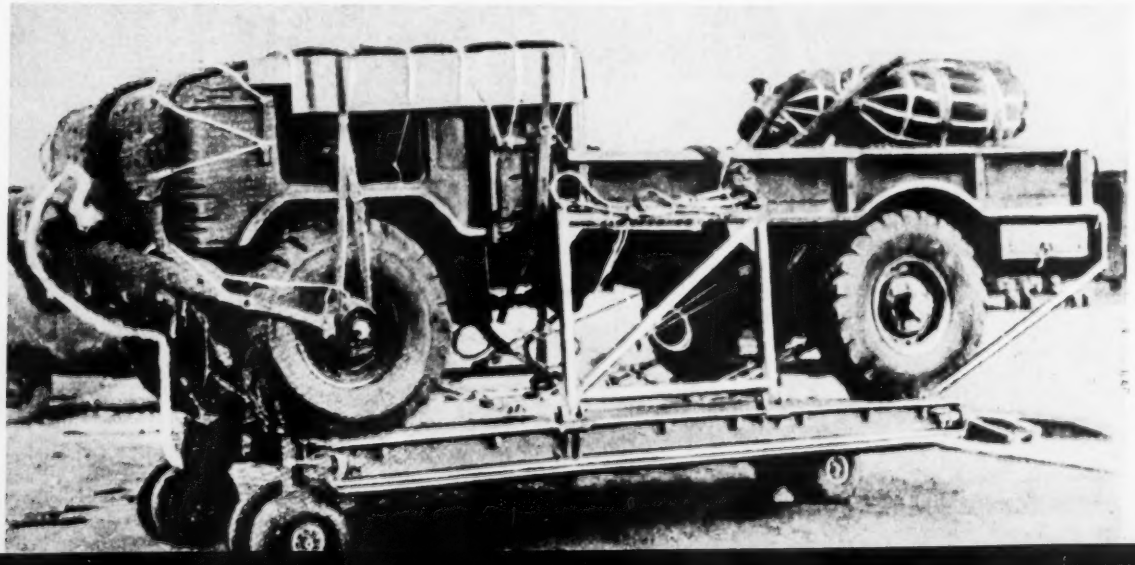
GAZ-66B truck ready for aircraft loading. The platforms are simple but rugged in design as is most Soviet equipment

As most Soviet equipment, the platforms are simple and rugged in design. The heavy-drop platforms are fitted with removable swiveling wheels at the rear and center of the platform. A unique feature is the mounting of additional larger wheels at the rear of the platform to facilitate movement of the unloaded platform in the rigging area and the movement of loaded cargo to the aircraft. Derigging of equipment has also been simplified. The Soviets claim to be able to derig a jeep type vehicle in 3 to 5 minutes.

A final significant factor in the airdropping of cargo is delivering the loads on target. Drop zones are selected with great care. Consideration is given to the type of aircraft making the delivery, the method of discharge, airspeed of the aircraft and load, and speed and direction of ground winds. An ideal drop zone for cargo would measure approximately 4,000 by 7,000 feet. In order to reduce deviation from target, aircraft electronics normally used for night and adverse weather operations are used routinely. As a final precaution cargo may be fitted with a light beacon to assist locating a load when it is off target.

The Soviet Union maintains a large and sophisticated military force. The ability to quickly move men and materiel to distant parts of the world is a means of projecting the might of this force. Air transportation is the key to this global power.

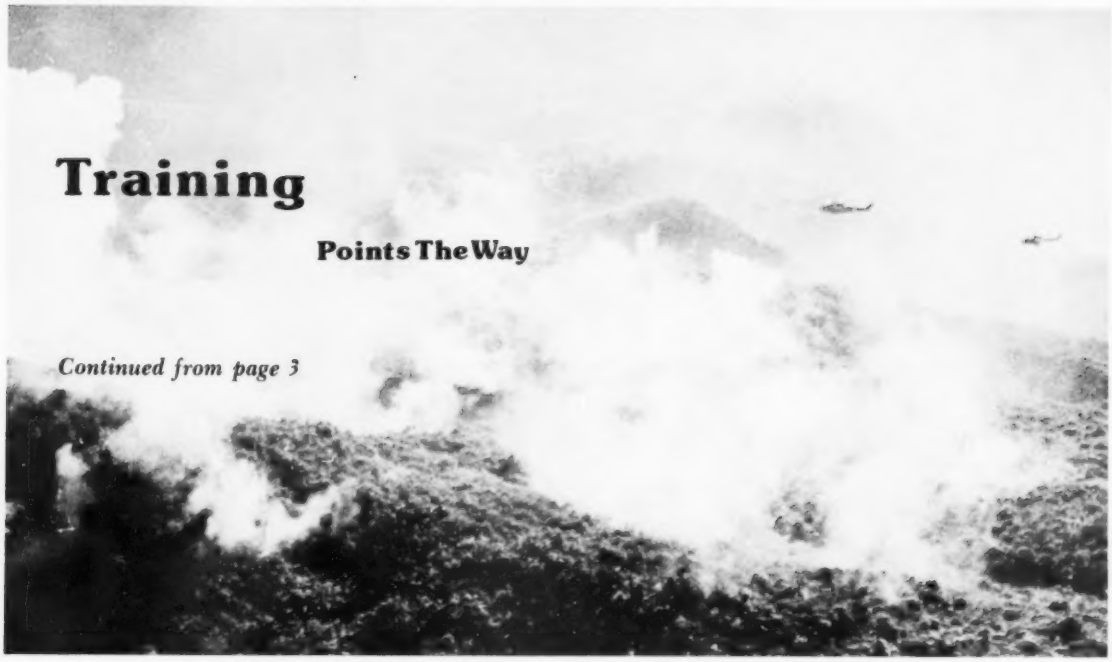
The U.S. Army Logistics Center, Fort Lee, VA, is constantly evaluating the logistics capabilities of other nations. In looking at these areas, to include the aerial delivery systems, we hope to better prepare our own combat, combat support and combat service support organizations for the future.



Training

Points The Way

Continued from page 3



From the base of experience gained in Vietnam (above) aviation units must train to win as part of the combined arms team on modern battlefields

what they cannot do under these restrictive conditions. There is no substitute for training at night. This is as true for aviation units as for all other Army units. The confidence of aircrews builds rapidly as they learn what they can do under the widely varying light conditions caused by different moon phases, seasons of the year and cloud conditions. Aircrews must practice with all the standard ways to augment operations during reduced visibility, i.e., flares, searchlights and with viewing devices. And they must continue to experiment to find better ways to use or combine current devices to enhance night operations. The key point is that we must train at night *now* with what we have and not wait for gadgets which may never come. *Are you happy with your night training?*

We must rid ourselves of the idea that there is such a thing as "administrative" flying for our tactical aviation units. How can we permit aviators to spend costly flying hours to learn flying habits that would be suicidal on a modern battlefield? Historically, the central thrust of aviation training directives and regulations has been directed at the individual training of pilots. We must reorient standardization training, regulations, the annual written examination, and our instrument training to point clearly toward the proper final objective—the development of aviation *units* trained to win as part of the combined arms team on modern battlefields.

There are today, and I suppose always will be, a bewildering array of decisions which must be made concerning aviation materiel developments, aviation organizations and the basic question of how much aviation is enough and what tradeoffs must the Army make to get there. Billions of dollars worth of aviation programs are at stake. These programs will be frequently reviewed (properly so) and affirmed, redirected, killed or augmented. But unless the Army demands and becomes accustomed to serious, dedicated and innovative training of aviation units on a day-to-day basis, we are not likely to get optimum decisions on aviation matters. There are many senior officers of the Army whose image of aviation results from their observation over the years of aviators doing "administrative" flying with training programs designed to meet annual minimums and passage of the annual writ. Flight detachment aviators are a small and important group of specialists, but they are far from the mainstream. We must focus our energy on winning the battle, not on administrative travel.

Training points the way. Not only for current readiness but to provide a foundation upon which to make program decisions for tomorrow. This bicentennial year—in fact this bicentennial day—is a good day to start the buck up.

VIEWS FROM READERS

Sir:

Your series of articles on tactical instrument flying has helped point out the importance of an effective airspace control system and the requirement for all concerned to understand how this system can support Army aviation operations. As a result of TAC/TRADOC Airspace Management agreements, provisions now exist for the establishment of an airspace control system.

What is an airspace control system, how does it work, and how can it contribute to the effective employment of Army aviation? First it is a joint Army-Air Force system that can be implemented *NOW* using currently authorized personnel and equipment. It includes Army and Air Force activities and procedures necessary for coordinating and integrating airspace requirements. On the Army side, the airspace control system includes airspace management elements (AME), flight coordination centers/flight operations centers (FCC/FOC), Army airfield terminal control facilities, and Army air defense command posts (AADCP). At maneuver brigade/battalion levels the unit commander becomes a part of the airspace control system because aviation and other airspace activities are coordinated at these levels at the personal direction of the commander. To be effective the airspace control system is under a single authority, the Air Force Component Commander, and must be responsive to the needs of all airspace users.

The flight assistance available to Army aviation through the airspace control system will vary from the advisory-only aspects of a monitoring service to one of positive control in a radar environment. Terrain flying has almost eliminated the FCC capability to provide flight following service to aircraft operating in forward areas. Also, because the FOC and FCC do not currently have radar, their capability to provide assistance during IMC is limited. An interim solution for the FCC is to use the direct support Hawk battalion radar capabilities to provide radar service to Army aircraft on a *standby* basis. (There is a common misconception that this service is available only on an *emergency* basis.) Other sources of flight assistance available to the Army aviator are the Air Force facilities that serve as part of the airspace control system. The Air Force control and reporting center (CRC), control and reporting posts (CRP), and forward air control posts (FACP) provide air traffic control with a radar capability. The Army aviator must know how to take advantage of these facilities.

The March 1976 article on instrument flying, "Air Traffic Management and Tactical Instruments," did not clearly depict the airspace control system and its capability to support Army aviation.

Using the same missions stated in that article, let's take another look at examples 1 and 2 and fly them in an area using an integrated airspace control system. Example 3 remains as flown since one condition is that radio contact cannot be established with any stations other than the FARRP and the aviation unit.

EXAMPLE 1

You must fly a utility helicopter from the corps rear area to a forward brigade location. You plan the flight using the unit SOP as a checklist. Your route of flight and altitudes are selected after considering such factors as the mission requirements, terrain, weather, tactical situation (includes the threat), and the current status and locations of air traffic control facilities and navigational aids. Your planning is not limited to only Army operated air traffic control facilities and navigational aids, but includes all available facilities that can support your flight. Your request for IFR clearance is relayed from your unit operations to the airfield terminal control. It is then relayed through the appropriate ATC facility, usually the FOC for Army requests, to the clearance authority which is the airspace management center located at the Air Force CRC. The flight clearance is received and you depart the basefield.

Enroute, your flight is initially monitored by the CRC and is under positive radar control. As you progress forward it is necessary to transition to a lower flight altitude in order to avoid enemy air defense detection and destruction. Your flight is handed over from CRC to an air traffic controller at a FACP. The FACP, an extension of the CRC, continues to provide you with positive radar control at your lower altitude.

As you progress forward and your altitude is reduced to avoid enemy detection, radar contact at the FACP is lost and you are told to contact the division FCC. The FCC, collocated at the direct support Hawk battalion operations center, has received information concerning your flight from the FOC. You contact the FCC and are told that radar contact has been made by one of the Hawk battery's continuous wave acquisition radar scans. The FCC also gives your present location, as determined by the Hawk radar contact, and provides other information concerning weather, air warnings and status of navigational aids. The FCC also provides radar vectoring using the Hawk radar.

Contact with the FCC is lost. Several minutes later you establish contact with an element of the forward brigade. You request and obtain weather conditions in the area and direct that the NAVAID there be turned on.

After tracking inbound and arriving at the brigade location, you initiate the preplanned approach to the portable nondirectional beacon (NDB). During descent to the minimum descent altitude (MDA), you break out of the low clouds and visually make the landing. You request the brigade S3 air notify the airspace management element at the division main CP that your flight has been completed.

EXAMPLE 2

You are the pilot of an observation helicopter assigned to an air cavalry troop operating near the forward edge of the battle area (FEBA). You have been directed to fly the aircraft from your location to the corps rear to a support maintenance facility.

By conducting a thorough map reconnaissance you select the route and determine the minimum enroute altitude. Contact with

the FCC cannot be made prior to takeoff but communications with the forward supported brigade confirm the location and operation of an enroute navigational beacon at the brigade aviation section location. The flight route is modified to use this beacon.

You request the forward supported brigade S3 air relay your intended route of flight, altitudes and estimated departure time to the division airspace management element (DAME). The DAME receives this information and coordinates it with other known aviation and air defense activities that may conflict with your flight. The DAME also relays your flight plan information to the division FCC who in turn notifies the FOC. The FOC, collocated with the CRC, coodinates your proposed flight with the airspace management center (AMC). The AMC alerts the appropriate FACP to provide ATC service when radar contact is established. Meanwhile, the division FCC, collocated with the direct support Hawk battalion operations center, coodinates your planned flight with the radar console operator in the AN/TSQ-38 fire distribution van. Remember, your flight has not yet departed, however, due to an effective, integrated airspace control system, you have all of the available ATC facilities ready to support your flight.

Your flight progresses as follows. You execute an instrument takeoff and fly at your planned minimum safe altitudes and headings. Your altitude is such that all attempts to establish contact with ground stations are unsuccessful. As you proceed farther toward the rear area, a higher altitude is continally selected to widen the safety margin above the terrain.

Contact is established with the division FCC and through Hawk radar contact you are given your location and provided radar vectoring to an NDB located in the division rear. Later you are able to receive the NDB and begin tracking inbound. The FCC also provides your IFR clearance as relayed from the CRC through the FCC. As your flight progresses you are handed over from the FCC to the FACP. Radar vectoring is provided to your destination. At the termination airfield, a GCA may be initiated if visual conditions are not encountered.

The airspace control system discussed above has been tested during joint training exercises and has proven to be a workable system. If you are interested in learning more about this system and what it can do for you, get a copy of the soon-to-be published FM 100-42/AFM 2/XX, "US Army/US Air Force Airspace Management In An Area of Operations."

COL Griffin N. Dodge
Department of Strategy
Command and General Staff College
Co-Chairman TAC/TRADOC Joint
Airspace Management Working
Group

Sir:

Frequently inquiries are made to the Reserve Components Liaison Officer and the Adjutant General (AG) Holding Custodian, U. S. Army Aviation Center (USAAVNC) at Ft. Rucket, AL, for copies of aviator original rating orders. The most frequent requests come from commanders of reserve component aviation units.

Many former active Army aviators wish to join either National Guard or Army Reserve aviation units. During inprocessing of these individuals, an administrative requirement of the Flight Evaluation Board is to review the flight records of the aviators. One of the more important documents is the original aviator rating order.

When separated from the Army, the individual's military personnel record (201 file) is forwarded to the U. S. Army Reserve Components Personnel and Administration Center (USARCPAC) at St. Louis, MO, where it remains until requested by the individual's new military unit. Because many individuals do not keep extra personal copies of documents such as their aviator original rating orders, it is necessary for the individual's new military unit to try to secure copies of the order from USAAVNC.

Commanders in the field cannot be expected to be knowledgeable of the AG records holding policies and procedures at USAAVNC and USARCPAC. As a consequence considerable time is lost and researching efforts are duplicated because inquiries are made with insufficient background information or the inquiry is made to the wrong records holding agency.

Information required to initiate search to locate an aviator's original rating orders includes: Special Order number, issuing headquarters and date issued. This information may be found in the individual's old DA Form 66 (block 15) or DA Form 66B (block 45). A portion of this information may be found in the individual's DA Form 2-1 (block 13—Pilot Ratings). Without accurate information, the records custodian must intensively research his files to locate the desired orders.

The USAAVNC Records Holding area retains these Special Orders for 3 full years after the cutoff date, which is always 31 December of the year in which the order was published. Example: SO 100, HQ USAAVNS, dated 21 September 1968. This SO remained in the active functional files in USAAVNC AG academic records until 31 December 1968. It was then transferred to USAAVNC AG Records Holding area for 3 full years. This SO, along with all other 1968 SOs, was shipped to the National Personnel Records Center (NPRC), Military Records Section on 31 January 1972. These records were then retired indefinitely in the NPRC Records Holding area.

To obtain copies of aviator original rating orders issued by the Adjutant General, USAAVNC, after 31 December 1969, address inquiries to:

National Personnel Records Center
111 Winnebago Street
St. Louis, MO 63118

To obtain copies of aviator original rating orders issued prior to 1 January 1970, address inquiries to:

Commander
U. S. Army Reserve Components
Personnel and Administration Center
ATTN: AGUZ-ED-SS
9700 Page Boulevard
St. Louis, MO 63132

To expedite the location of desired Special Orders requested of USARCPAC, aviation commanders should submit information shown in the box below for the year the order was issued. Complete shipping records are maintained for each year to include date of shipment, shipment number, bill of lading number, number of containers shipped and contents within each container.

I believe this information will be welcomed by the thousands of aviators and numerous aviation commanders who will in the future want to obtain the original aviator rating orders.

LTC Richard W. Lewis
Reserve Component Liaison Officer
U.S. Army Aviation Center
Ft. Rucker, AL 36362

INFORMATION FOR USARCPAC REFERENCE AVIATION ORDERS

Spec Orders for yrs	Shipped By	Date Shipped	Box Total No. of Boxes	Accession No.
1964	USAAVNC	18 Jan 68	6 of 7	68-A-1333
1965	USAAVNC	18 Jul 69	2 of 4	69-A-125
1966	USAAVNC	28 Jan 70	3 of 6	70-A-1059
1967	USAAVNC	18 Mar 71	2 thru 4 of 12	71-A-1216
1968	USAAVNC	31 Jan 72	14 thru 16 of 16	72-A-671
1969	USAAVNC, Jan-Oct	1 Feb 73	9 thru 10 of 22	73-A-557
1969	AG, Nov-Dec	1 Feb 73	2 thru 7 of 22	73-A-557
1970	AG	31 Jan 74	10 thru 25 of 28	SL74-A-810
1971	USAAVNC	31 Jan 75	2 thru 17 of 38	SL75-A-895
1972	USAAVNC	22 Jan 76	3 thru 19 of 19	338-76A-0215

USAASO Sez

The New ATC Equipment Course Is "Tops"

ANOTHER "PLUS" for the Army Air Traffic Control (ATC) field was scored recently when the Army Communications Command (ACC) requested activation of an Air Traffic Control Equipment Maintenance Course. The 8-week repair course is being taught at the U.S. Army Signal School, Fort Gordon, GA, and is geared to accept military occupational specialty (MOS) 35L20 and MOS 26D20. Completion of the course leads to the award of an additional skill identifier 2B4, identifying trained personnel as ATC Maintenance Specialists.

The Signal School has put together a meaningful course and filled a void that has existed in the ATC field for many years. The course offers training on communications and meteorological console AN/FSW-8; communications radios AN/GRR-21 and -22 and AN/GRT-23 and -24; dictaphone recorders; and nondirectional beacons. In addition interface of these systems in a control tower configuration is taught. Future expansion of the course, to include training on the terminal VHF omnidirectional range (TVOR) navigational system and instrument landing system (ILS), is planned. Further expansion is planned as new ATC equipment enters the Army inventory.

Upon completion of training, graduates will be assigned to one of many Army airfields operated and maintained by ACC with the responsibility of providing maintenance support for ATC equipment located at the airfield. A high degree of professionalism is required and is reflected in the way the course is presented.

Personnel interested in attending the ATC maintenance course should contact their unit training officer. Unit training officers can request a quota from CDRUSACC, ATTN: CC-PA-PT, Fort Huachuca, AZ 85613, or can contact Mrs. Burcham in the Office of the Assistant Chief of Staff, Personnel and Administration, Fort Huachuca, AZ, AUTOVON 879-6647/6640.

Prerequisites for the course are that an individual possess either MOS 26D or 35L, have a minimum education level score of 90, and have 9 months retainability upon completion of the course. Units requesting quotas must provide TDY and travel funds.

STANDARDIZATION Corner no longer will appear in the *AVIATION DIGEST*. Instead this feature will be published monthly as part of U.S. Army Agency for Aviation Safety's FLIGHTFAX, under the title of STACOM (Standardization Communication). The Deputy for Standardization, as proponent for STACOM, is anxious to hear from Army aviators worldwide and pledges to respond to flight standardization questions within 24 hours of receipt. Readers are encouraged to use the 24-hour flight standardization information center number (AUTOVON 558-3504, commercial (205) 255-3504) or to communicate by letter if more appropriate. Address your questions or requests for training assistance visits to Deputy for Standardization, U.S. Army Aviation Center, Fort Rucker, AL 36362.

In the near future the *DIGEST* plans to reinstate its Instrument Corner feature which was so popular in the magazine a few years ago. Also the *DIGEST* is considering starting a "checklist corner." Your comments concerning publication of instrument and checklist corners would be appreciated. Send them to Editor, *U.S. ARMY AVIATION DIGEST*, P.O. Drawer P, Fort Rucker, AL 36362.

Guatemala

Continued from page 5

With aircrews logging eight or nine hours daily during the relief operation, it became obvious that maintenance help would be needed. Aircraft maintenance had been provided by maintenance personnel of the 114th Aviation Company. On 12 February, they were joined by a 15-man maintenance team from the battalion's 590th Maintenance Company (Aircraft), which was airlifted in from the Canal Zone on an Air Force C-131 Hercules. Sustained maintenance was performed around-the-clock and with the use of the disciplined running periodic inspection concept, six complete inspections were performed without the loss of aircraft mission time during daylight hours. Additionally, an engine change was performed at a field site approximately 20 nautical miles west of Guatemala City.

An efficient flow of aircraft parts and specialized maintenance personnel was made possible through daily U-21 flights between the Canal Zone and Guatemala. Such liaison flights contributed significantly to the sustained performance in the disaster area.

The 210th's involvement in relief operations began to wind down on 16 February when the first two of the Hueys returned to the Canal Zone. After 10 March only two Hueys remained in Guatemala. They supported the 548th Engineer Battalion from Fort Bragg, NC, which had been called in to help reopen the important highway between Guatemala City and the Atlantic coast, a vital element of Guatemala's recovery from the earthquake.

Maintenance was an essential part of the relief effort. Two men from the 590th Maintenance Company install a new main rotor system on a Huey

Towns and villages in the countryside suffered the worst. In this village more than 2,000 residents died

Men form a chain to offload food and medicine at Chimaltenango, one of the most severly hit villages

During the hectic period of 5 to 29 February, the battalion's aircraft flew 833 hours completing 2,041 sorties; carried 246,662 pounds of relief cargo; transported more than 4,200 passengers and performed 750 medical evacuations.

Even though the 210th Aviation Battalion had deployed one-third of its total aircraft resources and 109 personnel to Guatemala, it still was able to carry out its mission of supporting the 193rd Infantry Brigade back in the Canal Zone. Indeed February was a long, tiring month for the men of the 210th, but also rewarding; for the collective professionalism and esprit de corps of the Army aviators had once again been put to test.

OPERATION WAGONMASTER

Continued from page 6

flight of six CH-47s, four primary and two standbys, and a total of 45 personnel departed Ft. Hood. At that time these people did not realize the magnitude of the earthquake destruction; the fact that more than 700 tons of vitally needed food, water and life supporting supplies would be delivered to Guatemala; and how warm and friendly the Guatemalan people are. All of these factors soon became realities.

Intermediate stops were made at Kelly Air Force Base, TX, for an international briefing; at Brownsville, TX, awaiting diplomatic clearance for entry into Mexico; and refueling stops were made at Tampico, Veracruz, Ixtepec and Tapachula, Mexico.

When the sun had set in Guatemala on 9 February, four Chinooks had arrived in Guatemala City and preparation had begun to support this disaster struck country. Within minutes coordination was being effected with the appropriate U.S. military group personnel at the Disaster Operations Center. After mission analysis it was determined that the majority of the cargo would be transported using the more rapid and economical external cargo net method. The first day's activities were quickly outlined and anticipated by all. By the end of their first day of operation, the four incountry helicopters had carried more than 70 tons of corn, beans and other vitally needed supplies to the hardest struck regions of the countryside. Meanwhile, the second flight of four CH-47s arrived at Guatemala City—again at sunset.

The total III Corps and Ft. Hood contingent, now incountry and eager to assist, included eight Chinooks and crews from the 34th Support Battalion; selected communications personnel from the 16th Signal Battalion; parachute riggers from Headquarters and Headquarters Company, U.S. Army Garrison at Ft. Hood; medical specialists out of the 507th and 11th Medical Companies; plus required linguists, maintenance personnel, pathfinders, fuel specialists and crewmembers from the 6th Cavalry Brigade.

Working altitudes, mountainous terrain and high winds were immediately recognized as formidable hazards to both aircraft and crews. Operating from the Guatemala airbase, with an elevation of 5,041 feet, flights were required to initiate climbs immediately after departure to clear the surrounding mountainous terrain. Adequate landing sites were scarce, and in some critical areas improved highways had to be blocked off to allow helicopter operations.

Where the landmass and village arrangement prohibited medium lift helicopter operations, UH-1 Huey helicopters from the 210th Aviation Battalion of the Panama Canal Zone, various vehicles and human resources were used to further distribute the essential supplies.

Resupply sites ranged from 5,000 to 7,000 feet in altitude with higher enroute flight levels often demanded. Although the relief operation occurred during the Guatemalan dry season, providing ample visibility during most working days, severe dust conditions in the landing sites, coupled with the working altitudes and high winds, definitely challenged a group of excellent aviators and crewmembers.

The Ft. Hood group provided a maximum effort throughout the 3 weeks of Operation Wagonmaster. While in Guatemala, the forces carried (externally and internally) a total of 709.5 tons of food, water, supplies and various types of equipment; transported 1,219 passengers; made 23 medical evacuations; and flew 199.5 hours. Entire mission data, including the trip to and from Guatemala, totaled 929 tons of cargo, or if you prefer, 1,858,000 pounds, and 377.9 hours flown. This was a tremendous effort during a critical time in the history of Guatemala.

Successful efforts of the magnitude just mentioned are not only the results of highly trained and efficient aviators, crewmembers and operational experts, but also are made possible through the abilities of all the various skills represented in the Ft. Hood contingent. Fuel specialists, as an example, played an essential role throughout the operation. This fact can best be illustrated by explaining an action that took place

Regardless of the situation, the aircraft must be refueled and receive the necessary maintenance

during refueling operations at Veracruz. At the time, a 4-inch refueling hose was unintentionally uncapped inside an aircraft. Instantly this large hose began to spray the interior of the CH-47 with highly flammable jet fuel. Specialist Five William Zaleski, realizing what had happened and without concern for his own safety, maintained control of the hose. He muscled it out of the aircraft, and although blinded and drenched by fuel, he did not release it until the pressure system was cut off and the hose became limp.

After receiving extensive first aid and changing clothes, Specialist Zaleski firmly requested, and was granted, permission to return to his refueling duties. His actions, truly heroic in nature, possibly saved the lives of numerous Soldiers, at least one CH-47 and certainly provided added inspiration for all concerned.

Although the personnel constituting the disaster relief force played a major role in a most successful operation, scores of others from many units, headquarters and even countries were equally effective. Members of the first flight will never forget an event that occurred 40 miles out of Veracruz while enroute to Ixtepec.

Because of adverse weather, the flight was required to land in a field site. Even before the rotor blades had stopped, crowds of people from Villa Isla, Mexico, immediately encircled the flight of aircraft. After concluding that the flight would be unable to continue, planning for the evening began. Thanks to the linguistic ability of Captain Edward Hayes, Sergeant First Class Ernesto Moya, Specialist Five Angel Delahoya and Specialist Four Erick Gonzalaz, the crewmen were able to communicate with the local residents in an effective and friendly manner.

Within an hour, the Presidente Municipal (Mayor) Nahum Dress Manica arrived at the field site to greet the contingent with fresh pineapples and well wishes from his community. Mayor Manica opened his townhall for a sleeping area, reserved rooms for crewmembers in the city's only hotel and provided free transportation to and from the field site. The hospitality of Mayor Manica and his community that cool, rainy night in February ensured them a warm, permanent place in our hearts and memories.

On 24 February, Secretary of State Henry Kissinger arrived in Guatemala on an official visit. The Ft. Hood contingent was selected by the U.S. Ambassador and the commander of the Military Group as a point of interest for the Secretary to visit. Secretary Kissinger witnessed the departure of the last resupply mission, greeted and shook hands with the Soldiers present and expressed his appreciation on behalf of the United States for a job well done.

The true impact and realization of the success of the Guatemalan disaster relief operation will and can only be known by the participants, the observers and the people of Guatemala. The death and destruction inflicted on this country was devastating. Only by the use of U.S. Army helicopters—and especially the Chinook, a word all Guatemalans grew to understand—were sufficient quantities of food, clothing, water and building materials delivered to the countryside.

The appreciation of the Guatemalan people was made known in many ways. Most often there was a crowd of well-wishers and observers at the base of operations. Families, mothers and fathers would come and request permission to take the members of the III Corps and Ft. Hood contingent shopping, to dinner, or on a trip for some rest and relaxation. Newspapers, meals and gifts were given, however reimbursement for these items was firmly but nicely rejected.

Most personally rewarding and sobering to the participants was the spirit and strength of the Guatemalans who bore the brunt of the disaster. Villages where two-thirds of the population was eliminated fought back—thrusting themselves into normal life patterns. Reflections such as an elderly Indian woman, barefoot and clothed in her native dress, praying and thanking God for the presence and assistance of a CH-47 helicopter and its crew can never be forgotten. This depth of appreciation was not limited to or shown by only the less fortunate and hardest struck, but also by Guatemalans such as a television channel assistant producer and a U.S. Embassy employe who outwardly expressed their feelings of "God bless those big birds" and "God bless you."

It was a privilege to be a part of the contingent from III Corps and Ft. Hood and to participate in this disaster relief operation realizing it can only be successful because of people. People such as the fuel specialist who performed an act of bravery; the citizens of Villa Isla, Mexico, who provided warm hospitality; and most importantly, the 92 men and women from Ft. Hood, who joined the many others from the United States to serve as able humanitarians. It is gratifying indeed to note in this bicentennial celebration year that the people of the United States still have a common goal with the founding fathers: to hold out the hand of friendship and assistance to our fellowman.

Major Terry N. Rosser was the OIC of the III Corps and Ft. Hood contingent and commander of D Company, 34th Support Battalion, 6th Cavalry Brigade (Air Combat). CW2 James E. Bennett was the mission aircraft maintenance officer. Photographs by Mr. Bennett and the U.S. Air Force

C-12A HURON

A New Member Of The Tean

LTC Robert F. Forsyth
Experimental Test Pilot and
Research And Development Coordinator
Systems Development And Qualification Division
RD&E Directorate
U.S. Army Aviation Systems Command
St. Louis, MO

ARMY AVIATION has added a new member to its stable of fixed wing aircraft—the C-12A Huron, manufactured by Beech Aircraft Corporation of Wichita, KS. Beech Aircraft was awarded a contract to manufacture 20 C-12A aircraft for the U.S. Army and 16 for the U.S. Air Force during the year beginning July 1975 to meet their UX/CX-X requirement.

Subsequently the Army and Air Force obtained an option to procure another 100 and 14 aircraft respectively. The Army option is for 20 aircraft per year over a 5-year period. The Air Force exercised its 14 aircraft option in July 1975 and the Army exercised its first 20 aircraft option in August 1975.

What are some of the features of the C-12A which enhance its operation? Let's start with the cockpit. The first thing "old" U-8 and U-21 pilots will notice is the cockpit arrangement. Gone is the Beech commercial layout so familiar to you. The commercial cockpit was designed and configured for single pilot operation. Such an arrangement forces several compromises to optimum control display and switch arrangement, as those of you who have flown the U-8 and U-21 recognize. So while buying a modified "off-the-shelf" aircraft the Army was able to better optimize the cockpit for the two-pilot operation desired by the military services for this type airplane. The "militarized" cockpit allows both pilots easy access to all switches, circuit breakers' rheostats and avionics control heads, and therefore allows total aircraft system control from the right seat when desired (figure 1).

To enhance its capability as an all-weather transporter of people and things, the aircraft has been equipped with a comprehensive IFR avionics package which includes: weather radar; DME; dual VOR/ILS; dual ADF, dual VHF comm; HF, MB and diversity (360-degrees coverage) transponder (figures 2 and 3).

Cockpit lighting also represents a much needed "first" for Army aviation. All instruments, control heads and panels are integrally lighted and the lighting intensities balanced. The specification which required this was the most advanced ever incorporated into a production contract for an Army aircraft. Unwanted glare has been reduced through the use of special coatings on the instrument cover glasses and incorporation of improved dimming controls allow uniform dimming to below the threshold of

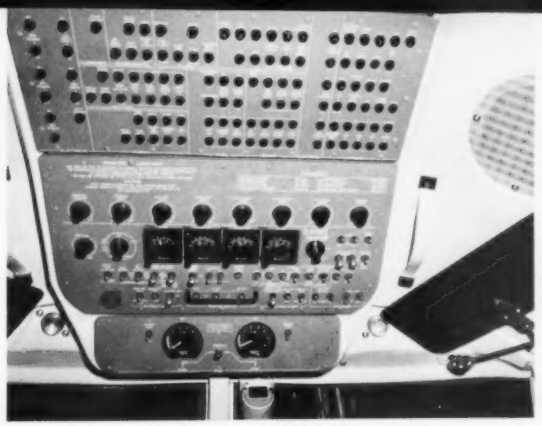


Figure 1
Overhead Console

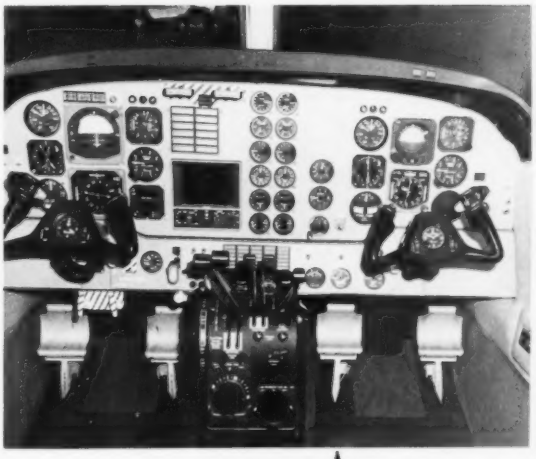
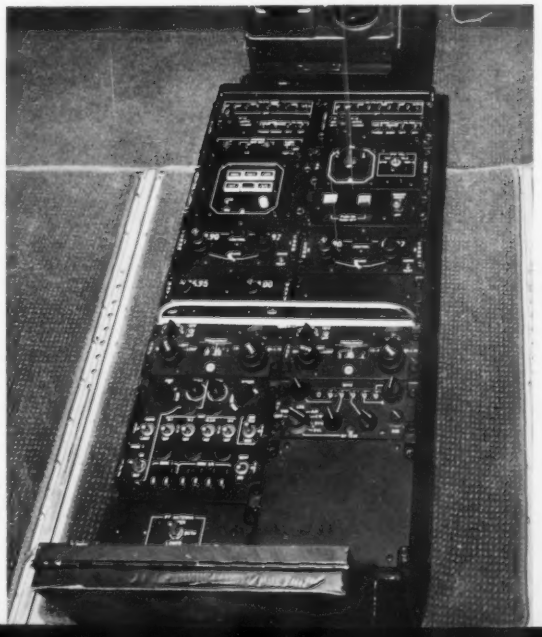


Figure 2
Instrument Panel And Throttle Quadrant

Figure 3
Center Console



See Acronym Key On Page 27

visibility.

To aid the pilot and reduce his workload an automatic flight control system, consisting of a flight director and three-axis autopilot, is provided. This allows automatic control of heading, navigation, altitude, airspeed and approach (to include back-course ILS).

Safety is enhanced by incorporation of a rudder boost system, dual gyrosyn compasses, emergency locator beacon, high intensity (3,500-candlepower daytime intensity) strobe beacon, ice inspection lights, and dual 1,000-candlepower landing/taxi lights and a survival raft and kit. The passenger/cargo compartment floor is designed to withstand concen-

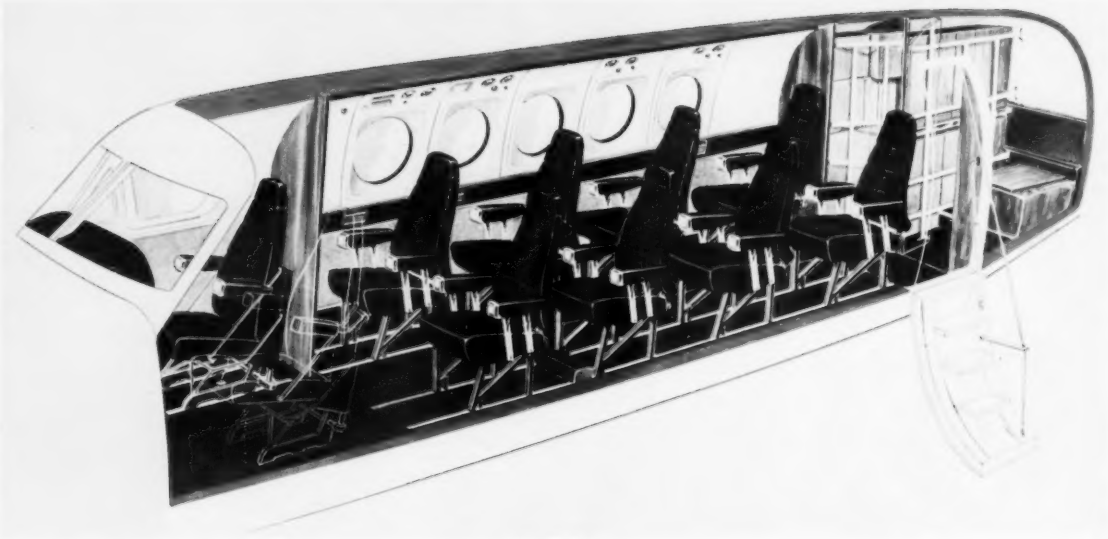


Figure 4

Cabin Arrangement (Standard 8 Passenger)

trated loads of 200 psf when supported by the seat tracks and 100 psf in other floor areas. The seat with its supporting floor structure is capable of withstanding crash design loads when occupied by a 250-pound person (facing forward) and a 170-pound person when facing aft (FAA requires crash design for 170-pound person for either seating direction).

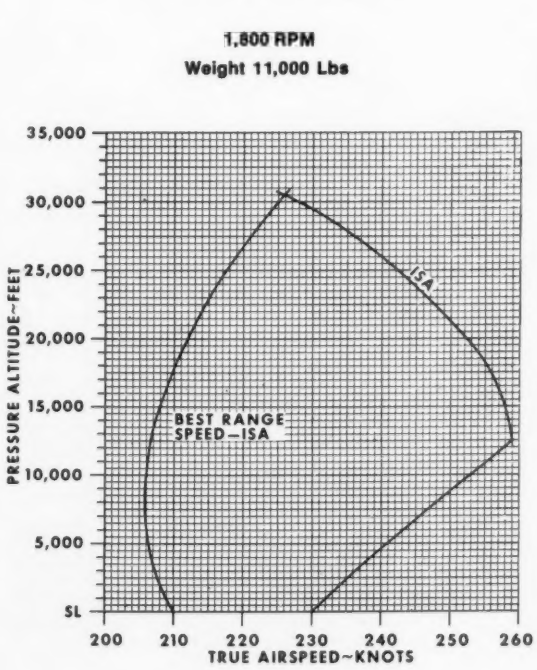
The passenger/cargo compartment is arranged to provide for eight passengers, a toilet area, a baggage area capable of accepting 300 pounds of baggage and a survival kit (see figure 4). The entire cockpit and cabin/cargo area is pressurized to a differential of 6.0 psi, allowing the aircraft to maintain a cabin altitude of below 10,000 feet at cruise altitudes up to 31,000 feet.

In the event of loss of pressurization, an emergency oxygen system provides both crew and passengers with sufficient oxygen to descend from 30,000 feet to safe breathing altitudes. It also provides sufficient reserves to allow the pilot and copilot to continue to breathe normal demand oxygen for the remainder of the flight from a half-way point on a maximum range mission.

The passenger masks are the standard airline passenger type which provide continuous oxygen flow. The pilot and copilot are provided with quick donning masks which incorporate the diluter-demand/100 percent regulators and microphone. In addition to pressurization the aircraft environmental control system provides heating, cooling and ventilation suf-

Figure 5

Maximum Cruise Speeds



	U-21A/G	C-12A
Takeoff/Landing GWT	9,650/9,168 lbs	12,500/12,500 lbs
Cruise Speed Alt*	180 KTAS @ 10,000 ft	240 KTAS @ 25,000 ft
Range (w/45 min res)	935 NMI	1,040 NMI
SE Service Ceiling	12,000 ft	16,700 ft
SE Rate of Climb (SL 95 degrees F)	290 fpm	545 fpm
Landing Distance (50 ft obst)**	2,440 ft @ 9,168 GWT	2,600 ft @ 12,500 GWT
Takeoff Distance (50 ft obst)	2,000 ft	2,820 ft
Service Ceiling	25,000 ft***	31,000 ft
Vmc	88 KIAS	87 KIAS
Vmo	208 KIAS	270 KIAS
SE Best R/C Speed	112 KIAS	121 KIAS

* U-21A/G cruise at 10,000 feet due to lack of cabin pressure
** At max landing gross weight
*** Qualification limit

Figure 6
Comparison between the C-12A and the U-21A/G

ficient to maintain a comfortable cabin temperature regardless of outside air temperatures.

The aircraft is FAA certified to fly into moderate icing conditions. The ice protection subsystem provides electrical anti-icing for the pitot, windshields and propeller, and pneumatic deicer boots for the wings and horizontal stabilizer (extensive testing established that deicing is not required for the vertical fin). Engine inlets are anti-iced by engine bleed air. Rain removal is provided the pilot and copilot windscreen by electrically driven windshield wipers.

All these features enhance the usefulness of the C-12A, but for aviators the most significant measure of an aircraft is its performance and handling qualities. Typical cruise speed performance of the C-12 is shown in figure 5. A comparison between the C-12A and the U-21 is shown in figure 6 and provides a basis for judging the increased capability of the C-12A.

The rudder boost system mentioned earlier helps the pilot in maintaining directional control following an engine failure or a large variation of power between the two engines. This unique feature involves the incorporation of two pneumatically boosted servos in the rudder cable system which are activated by a preset pressure differential switch. This switch senses bleed air pressure from each engine. The boost system provides about 60 pounds of rudder pressure aid to the pilot.

The C-12A underwent an engineering flight evaluation by the Army Engineering Flight Activity, Edwards AFB, CA, during the winter and spring of 1975-76. These tests determined the degree to which the aircraft met the contractor's performance guarantees, established soft and rough field capability, and assessed the C-12's overall handling qualities characteristics.

The flight and maintenance crews for the C-12s are being trained at the Beech Training Facility at Wichita. Logistics support for the aircraft is provided by Beech Aircraft on a worldwide basis. This support includes maintenance, overhaul and parts. This total logistics support is a new concept to Army aviation and has both DOD and Congressional blessing. It is hoped that the users give it a fair trial as it has many advantages in this time of budgetary and manpower constraints.

The initial aircraft production is being allocated to major headquarters in the U.S. and to major headquarters and military assistance groups in Europe, the Far East, Africa and the Middle East. Ultimately the C-12 will be the replacement for a portion of the Army's aged and well used U-8 fleet and some of its older U-21As. The C-12 will be with the Army at least until the turn of the century. Its usefulness is limited only by the imagination of those of us who fly and use it.

Acronym Key

ADF	automatic direction finder
DME	distance measuring equipment
FAA	Federal Aviation Administration
fpm	feet per minute
GWT	gross weight
HF	high frequency
IFR	instrument flight rules
KIAS	knots indicated airspeed
KTAS	knots true airspeed
MB	marker beacon
NMI	nautical miles
psf	pounds per square foot
psi	pounds per square inch
R/C	rate of climb
SE	single engine
SL	sea level
USA	United States Army
USAF	United States Air Force
UX/CX-X	Department of Defense (DOD) and Congressional directed joint procurement (USA/USAF) of an "off-the-shelf" utility/executive type aircraft for the support of attaches, MAAGs and major headquarters. The Army was designated the procuring agency for both services
VHF	very high frequency
Vmc	minimum control speed, critical engine inoperative
Vmo	maximum operating limit speed
VOR/ILS	VHF omnidirectional range/instrument landing system

SERIOUS SHORTCOMINGS

USAAAVS
Major William C. Childree
Directorate for Aircraft Accident
Analysis and Investigation
U.S. Army Agency for Aviation Safety

OVER A RECENT 3-month period, overgross condition and/or out-of-CG condition was a factor in five accidents and suspect in two others. These accidents resulted in eight fatalities and thirteen injuries and cost $1.5 million in aircraft losses. This prompted a hard look at the performance charts in the UH-1H/AH-1G operator's manuals. We found deficiencies in the performance charts serious enough to warrant the recommendation that they be revised.

Some of the shortcomings are:

- Information is misleading when determining, before actual flight, the aircraft's weight limitations for a particular temperature and altitude.
- The charts present misleading information based on engine performance and disregard transmission capabilities.
- Three terms used to describe engine power (military power, normal power and takeoff power) output are neither adequately defined nor applied consistently throughout the charts in the manual. Since these terms all represent power outputs in excess of the transmission limits or in the case of takeoff power, an unidentified quantity, the charts present *unattainable* performance levels for these aircraft

It is apparent that few aviators use the charts because these deficiencies would have been revealed before now. Failure to use the charts can be attributed to the total lack of formal instructions in their use and interpretation during initial aviator training.

USAAAVS has recommended revision of the performance charts, development of a compact computer which can be easily used in the cockpit, revision of inconsistent regulations, and a requirement for the basic aircraft weight to be entered on DA Form 2408-13.

USAAAVS supports immediate implementation of formal classroom instructions on the use of aircraft performance charts (as revised charts become available) during initial qualification training on all aircraft.

All aircraft can be dangerously overloaded. What is more, the UH-1H and AH-1G often are and the performance charts in the operator's manuals are part of the problem

Until these recommendations have been implemented and the charts revised, USAAAVS suggests the following techniques be followed.

Best method. Since the performance charts in the operator's manuals are misleading, the go-no-go placard is your best method of determining if sufficient power is available for safe takeoff. The following information, taken from the dash 10, will enable you to review the standardized instructions for using the go-no-go placard for the T53-L-13 series engines.

NOTE: For T53-L-13 engines. In addition to the

power required to hover at 2 feet, a 2 percent reserve N_1 is required to climb out of a confined area. Therefore, if the engine maximum is 96.5 percent, takeoff from a confined area should not be attempted when the 2-foot hover power requirement is more than 94.5 percent.

1. Takeoff from a confined area. To determine if sufficient power is available to safely execute a takeoff from a confined area, the following procedures apply:

a. Check the percent of N_1 required to maintain a stabilized 2-foot hover.

b. Check the outside air temperature (OAT).

c. Relate hover power and OAT to the go-no-go placard.

d. If the percent N_1 required to hover at 2 feet does not exceed that listed on the placard for that OAT, and 50 psi torque will not be exceeded, the aircraft has sufficient power for exiting a confined area. (Note below applies.)

2. Normal takeoff. To determine if sufficient power is available for a normal takeoff, the procedures are as follows:

a. Check the percent N_1 required to maintain a stabilized 2-foot hover.

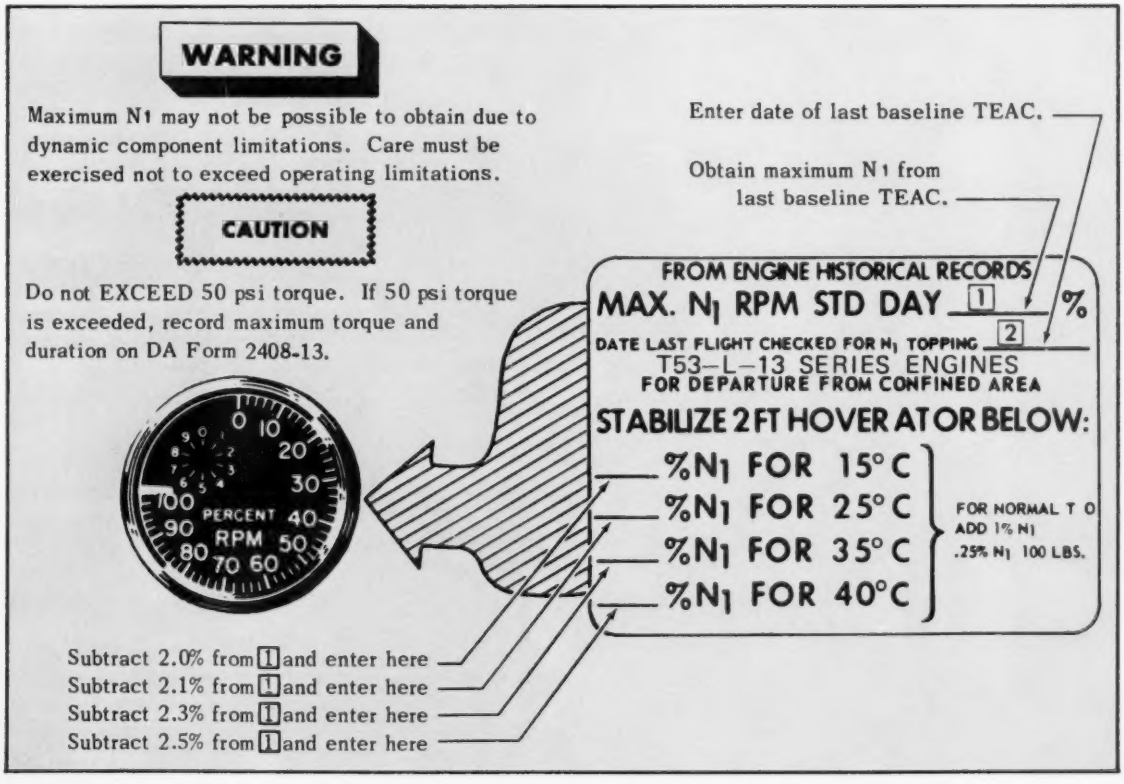
b. Check the OAT.

c. Relate hover power and OAT to the go-no-go placard.

d. If the percent N_1 required to hover does not exceed that listed on the placard for the appropriate OAT by more than 1 percent, the aircraft has sufficient power to execute a normal takeoff. (Note below applies.)

NOTE: If the OAT falls between the OATs listed on the go-no-go placard, read the percent N_1 corresponding to the next higher temperature. DO NOT INTERPOLATE. If the percent N_1 required to hover at 2 feet does not meet the criteria established in 1d and 2d above, the load must be reduced (.25% N_1 = 11 lbs.).

It is the responsibility of the pilot to ensure that his aircraft is loaded properly and mission ready, but such responsibility does not abrogate supervisory or command responsibility to ensure that proper procedures are followed. Use the go-no-go placard and weight and balance accidents can be prevented.


WARNING
Maximum N1 may not be possible to obtain due to dynamic component limitations. Care must be exercised not to exceed operating limitations.
CAUTION
Do not EXCEED 50 psi torque. If 50 psi torque is exceeded, record maximum torque and duration on DA Form 2408-13.
0 10 20 30 40 50 60 70 80 90 100
PERCENT RPM
Enter date of last baseline TEAC.
Obtain maximum N1 from last baseline TEAC.
FROM ENGINE HISTORICAL RECORDS
MAX. N1 RPM STD DAY [1] %
DATE LAST FLIGHT CHECKED FOR N1 TOPPING [2]
T53-L-13 SERIES ENGINES
FOR DEPARTURE FROM CONFINED AREA
STABILIZE 2 FT HOVER AT OR BELOW:
%N1 FOR 15°C
%N1 FOR 25°C
%N1 FOR 35°C
%N1 FOR 40°C
FOR NORMAL T O ADD 1% N1 .25% N1 100 LBS.
Subtract 2.0% from [1] and enter here
Subtract 2.1% from [1] and enter here
Subtract 2.3% from [1] and enter here
Subtract 2.5% from [1] and enter here

Ted Kontos
Publications and Graphics Division
U.S. Army Agency for Aviation Safety
USAAAVS

Fourth in a series of episodes on George, your unit ASO, who died from frustration after his training had taught him the professional approach to safety

Who Killed George?

HE GAZED INTO the mirror as he pushed his comb into his pocket. He was ready—freshly bathed, clean shaven, dressed, with all his gear packed. In a short time he would be heading to a unit "where he could apply his vast storehouse of knowledge toward the prevention of accidents." As a skilled ASO he should have been filled with enthusiasm. But he wasn't. His mind still dwelled on the charred remains of what had once been a proud Huey. Now, the crumpled, blackened skeleton could hardly be identified as even belonging to the family of UH-1s. The crew and passengers had sustained severe burns, but fortunately, had survived the crash and fire.

The aircraft had been on an administrative flight in South Vietnam. It had not been fired upon; it had crashed in a secure sector; and all indications spelled mechanical failure as the cause. He would not be able to identify any specific cause factors as there would be no investigation. The unit was too busy for that. Aircraft had to be maintained, scheduled VIP flights had to be completed, hot meals had to be picked up for delivery to weary troops in the field and George's commander was coming up in the secondary zone for promotion. Surely an isolated instance, unfortunate as it might be, shouldn't be allowed to disrupt the unit's effectiveness. Besides, no accident report was required when an "accident" could be charged off to combat loss. Why blemish an otherwise spotless safety record? Call it as we see it—combat loss.

But George hadn't given up. Mentally he tried to fit the pieces together. If his suspicions of mechanical failure proved correct, other accidents from the same cause could occur at any time. That "any time" was just a few days away when another aircraft from his unit was involved in an accident under similar circumstances and in nearly the same location as the first accident. This time surely there would be an investigation. No, George was wrong again—another combat loss! At least the occupants had fared better this time, having emerged with only minor injuries. But the cause was still unknown. Another difference cropped up this time. George's insistence to conduct an investigation following the second accident seemed to really irritate his commander.

The final blow came a few days later when a third aircraft from his unit was involved in a major accident while on an administrative flight. This time the circumstances were different. Another set of problems had caused this accident. But the procedure was identical to that following each of the preceding accidents—no investigation—combat loss. And now after three accidents had occurred within a month's time, George was suddenly being reassigned to a unit "that really needed a safety officer," a place where he could more effectively apply his talents. George was highly recommended by his commander for "having established an enviable accident-free record for his unit."

George cast a final glance at the mirror. He didn't know it, but he was staring at a dying man.

"To assure safe and healthful working conditions for working men and women. . . ." These words introduce the Williams-Steiger Occupational Safety and Health Act of 1970—an act formulated with you in mind and dedicated. . .

TO YOUR HEALTH!

IT HAS LONG ago been stated that necessity is the mother of invention, and it was necessity that prompted the development and enactment of the Occupational Safety and Health Act of 1970, more commonly referred to as the OSHACT. In this instance, necessity manifested itself in the form of statistics that showed a progressive increase in the number of accidents and illnesses associated with occupational-induced hazards. In some specific areas, the number of job-related illnesses, injuries and fatalities was several times greater than the national average. All evidence pointed to a definite need for the establishment and implementation of safety and health standards for practically every occupational field. True, various public laws have been enacted over the years to protect workers, but these have been few and applicable only to specific occupational fields. For most job areas, safety guidelines and standards or controls have been practically nonexistent.

In December of 1970 the OSHACT was enacted, and 120 days later, on April 28, 1971, it became law. The agency responsible for administering the Act is the Occupational Safety and Health Administration (OSHA) of the U. S. Department of Labor.

Basically, the OSHACT is designed to enhance the safety and health of working men and women by combating ignorance. While this, of course, is a gross oversimplification of the Law, the timely application of knowledge is precisely the chief ingredient OSHA is depending on to promote safety and preserve human

Ted Kontos
Publications and Graphics Division
U.S. Army Agency for Aviation Safety
USAAAVS

resources. In brief, the Act requires the Secretary of Labor to establish mandatory job safety and health standards; to provide an effective enforcement program; to establish and make available reporting procedures concerning job injuries, illnesses and fatalities; and to conduct, either directly or indirectly, continuing research relative to occupational safety and health.

Obviously, the key word is knowledge, and it is easy to see why. For years dust particles emitted by a certain substance during fabrication were thought to pose no health problem. The particles were coarse, noninflammable and considered nontoxic. However, research has more recently shown that these particles can, in some instances, be instrumental in producing serious lung disorders when inhaled. Consequently, protective measures have since been developed and implemented. Similarly, another product, normally considered inert, was found to produce extremely toxic vapors when heated. Although the material was not heated during fabrication, cutting and grinding operations produced fine dust-like particles that could readily come in contact with cigarettes in an open packet. Smokers could then inhale the toxic gases generated when the contaminated cigarettes were smoked at some later time and place. Again, protective measures were instituted and enforced to eliminate this threat.

In a sense, OSHA's safety and health policy is much akin to our own aviation safety program whereby we strive to determine potential hazards, remove them, or develop protective devices or procedures when we can't eliminate them, and then enforce such procedures by means of regulations and SOPs. In addition, we provide continuing research to prevent the introduction of potential hazards during the design stage of new equipment, and we employ a reporting system that enables us to continually gather data to be used in identifying problem areas for correction before additional mishaps from similar causes can occur.

The Act covers every employer with one or more employees whose business affects commerce. Presently, the OSHACT does not affect workplaces covered under such federal laws as the Coal Mine Health and Safety Act, the Federal Metal and Nonmetallic Safety Act, and the Atomic Energy Act of 1954.

Administration and enforcement of the Act are vested primarily with the Secretary of Labor and the Occupational Safety and Health Review Commission, a quasi-judicial board of three members appointed by the President. Health research and related functions are vested with the Secretary of Health, Education and Welfare (HEW) whose functions, for the most, are carried out by the National Institute for Occupational Safety and Health established within HEW. Occupational safety and health inspections of the private sector are the functions of OSHA inspectors located in offices established, or to be established, in various communities throughout the U. S. and its possessions.

Federal employees and military personnel were not included under this Law until President Nixon signed Executive Order 11612 in July 1971. In this order, the President stated: "As the Nation's largest employer, the Federal Government has a special obligation to set an example for safe and healthful employment. It is appropriate that the Federal Government strengthen its efforts to assure safe and healthful working conditions for its own employees." He ordered the heads of Federal departments and agencies to establish occupational safety and health programs which "shall be consistent with the standards promulgated by the Secretary of Labor." In short, if you are a government employee or a military service member, you are included—specifically, by Section 19 of the OSHACT.

Over the years, the Army has developed and published safety and health standards. These are found in military regulations, technical bulletins, manuals and directives for specialized equipment, materiel and facilities. As stated in Headquarters, DA, DCSPER letter dated 9 September 1971, commanders and supervisors of Army operations and activities will, in effect, provide safe and healthful places and conditions of employment consistent with the OSHA safety and health standards. To ensure that OSHA standards are being met, Army facilities and equipment must be surveyed. Where military requirements are unique and no OSHA standards are applicable, the Army will develop appropriate safety and health standards.

While the above procedure sounds simple enough, it gives rise to several questions. Where do we find OSHA standards that apply to military operations which are not unique and which have their counterpart in the private sector of industry? Where do we obtain necessary funds for conducting meaningful surveys? If discrepancies are uncovered and corrective actions require additional funds, where do we obtain these? To complicate matters, the element of time is involved. It takes time to obtain funds to conduct surveys, evaluate the results, determine corrective actions required, and obtain additional funds for needed changes. Finally, it takes time to incorporate these changes.

TO YOUR HEALTH!

OSHA standards are published in the Federal Register together with revisions. These standards are divided into three major categories: General Industry, Maritime, and Construction. Single copies of digests covering each category may be obtained from the nearest OSHA regional office or from the OSHA Office and Management Services, Washington, DC. Copies may also be obtained from the Superintendent of Documents, Government Printing Office, Washington, DC 20402. An annual subscription to the Federal Register may also be obtained from the Government Printing Office.

To assist responsible personnel in keeping current with the standards, OSHA has developed a new subscription service available through the Government Printing Office. It consists of five volumes, and subscribers may request any or all of the volumes. Each is updated periodically with looseleaf insertions. The five volumes are:

Vol. I—General Industry Standards

Vol. II—Maritime Industry Standards

Vol. III—Construction Industry Standards

Vol. IV—OSHA Regulations, including interpretations of standards and revisions

Vol. V—Compliance Operations Manual—the book that guides OSHA compliance officers

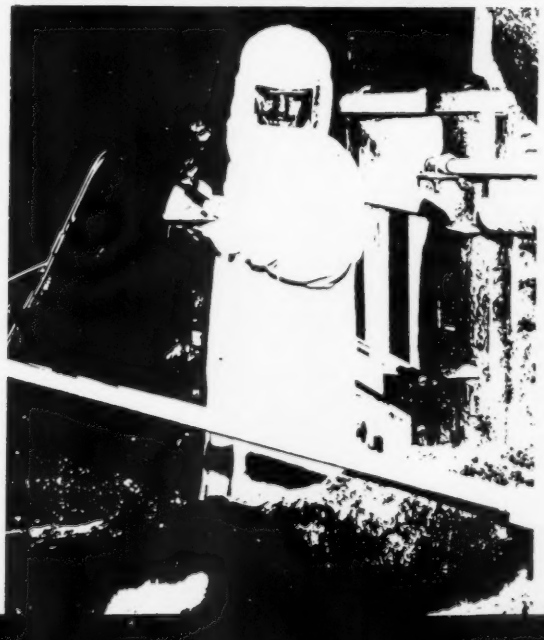
OSHA standards have also been published in volumes and books sold by commercial concerns and such other agencies as the National Safety Council and the Bureau of National Affairs. To obtain copies of OSHA standards applicable to their types of operations, Army units should coordinate with their installation safety director's office. Paragraph 1-5 of AR 385-10 authorizes specific services, including surveys to determine compliance with OSHA, which can be requested from the installation safety director.

In early 1974, the Department of the Army requested that major commands submit funding requirements needed to conduct surveys, with additional funding requirements to be submitted on an annual basis. In October 1974, President Ford issued a second executive order which strongly guided federal agencies regarding their OSHA responsibilities to all employees. In November 1974, the most recent OSHA provision, 29 Code of Federal Regulations, Part 1960, "Safety and Health Provisions for Federal Employees," was adopted. While DOD has not yet implemented Part 1960, it is developing procedures to comply with the OSHA Act. In the absence of any DOD standards, DA requires compliance with OSHA standards. During mid 1975, the Office of Management and Budget announced requirements for federal agencies to enter occupational safety and health related costs as a separately financed line item on their budget submissions. Since a key to OSHA compliance is the provision of adequate funds appropriated by Congress, the new budget procedure will have a substantial impact. Safety managers must ensure that OSHA compliance costs are carefully estimated so that the budgeting process is sound. Bear in mind, when OSHA funds are allocated, they must be used for the purpose intended.

Admittedly, progress made by federal agencies to date has been slow—a fact that has disturbed Congress. So much so that congressional hearings were held in July of 1975 to review accomplishments and determine deficiencies requiring further action.

It is important to note that while government agencies have certain responsibilities, military personnel and federal employees also have specific responsibilities as individuals. For example, it is the individual's responsibility to familiarize himself with OSHA standards applicable to his job. He is further responsible with following these safety and health standards which may include the wearing of certain protective clothing or the use of specified protective equipment. He is equally responsible for reporting any hazardous conditions he may note to his supervisor for correction. If he sustains any job-related injury or illness, he must report it and seek prompt medical treatment.

By the same token, an individual has the right to obtain a copy of OSHA standards and other rules, regulations and requirements that apply to his job. If a copy is not available at his unit level or at his place of employment, he may obtain one from the nearest OSHA office or the Government Printing Office. He may also request information from his supervisor or employer concerning safety and health hazards in his work area, precautions he should take and procedures he should follow if he should become involved in an accident or be exposed to some toxic substance. If no corrective action results from a good-faith effort to



have an existing hazardous condition eliminated, an individual may register a complaint, and if necessary, request an inspection of his work area, with assurance he will not be discriminated against for doing so.

At one military hospital, operating rooms were determined to be unsafe. The particular hazards found were deemed to be sufficiently great that the operating rooms were ordered closed until corrective measures could be incorporated. Meanwhile, arrangements were made for nearby civilian hospitals to handle emergency cases involving military patients.

In another instance, a steam radiator was coated with a type of paint that emitted an irritating vapor when heated, making employees ill. When no corrective action was taken after the employees reported the matter to the supervisor, an official complaint was registered. Within 24 hours, the problem was corrected.

While knowledge of the OSHA Act and how it affects federal agencies may not yet be widespread among the military services, it is rapidly gaining ground, and the responsibility for military units to comply with the Act is being found in more and more Army publications. For example, Section I, Chapter 7, paragraph 8, change 20 of TM 55-1500-204-25/1, Shop Practices, states that ". . . safety engineers and safety officers will ensure that proper safety procedures are adhered to in accordance with AR 385-10, The Army Safety Program; AR 385-30, Safety Color Code Markings and Sights; AR 385-32, Protective Clothing Equipment; *the Occupational Safety and Health Act of 1971*; all applicable fire codes; and other accepted civilian and military safety practices."

Keep in mind that the OSHACT is not intended to establish policies or to regulate or control safety practices affecting unique military exercises, tactics or special military operations, such as most procedures used when operating aircraft. These are all responsibilities of the Army. Nevertheless, a new era in safety and health for the working person has dawned. Admittedly, like an infant learning to walk, progress has been slow. But you can look for it to gain momentum rapidly in the future. The DOD Safety Office has recently completed its OSHA Policies, Procedures and Programs Manual, and upon its release, appropriate implementing measures will be taken by the Department of the Army.

HYPERVENTILATION - CAUSES AND CURES

THREE RECENT HUMAN Factor Mishap Reports illustrate vividly the need for all aviation personnel to be thoroughly familiar with problems associated with respiratory physiology in the flight environment. In the first mishap, an aviator on a CH-54 IFR training mission in cruise flight at 3,500 feet msl became queasy and noticed a tingling sensation in his legs. He turned the controls over to the IP and shortly afterwards passed out for approximately one minute. The flight was diverted back to its home airfield, where the aviator recovered without incident. All preliminary medical tests were negative.

Two weeks later, while on a VFR test flight at cruise altitude, an OV-1 technical observer (TO) complained to the pilot that he was feeling ill. The pilot initiated an approach to his base airfield but was advised that the runway was closed due to an emergency on the airfield. The pilot then orbited the airfield for 15 minutes at which time the TO told him that his feet and tongue were numb. The pilot again requested to land but was advised that the runway was still closed and to divert the flight to another nearby airfield. He complied and requested that an ambulance stand by. En route to the second airfield, the TO's hands began to shake and he began to lose consciousness. On final approach he became unconscious. The aircraft landed and the TO was evacuated to the post hospital where he recovered completely. Medical examination and tests were negative. Contributing to the problem was the fact that he had had the "flu" for the preceding three days and had not eaten for the 24 hours before the mishap.

In the third mishap, a U-21 crew on a night IFR training mission flew for 1 hour and 50 minutes at altitudes below 10,000 feet msl, then climbed to 12,000 feet. After 20 minutes at 12,000 feet, the copilot complained of being lightheaded. The pilot then descended to 9,000 feet, assuming that the symptons might be due to hypoxia. After 40 minutes at 9,000 feet the copilot became nauseated and complained of numbness in his hands and arms, and within 3 to 5 minutes lost all functional use of his hands and arms. Fearing some form of dysbarism the pilot initiated a climb to 12,000 feet. Passing through 11,000 feet the symptoms of numbness and nausea started to subside. After 5 minutes at 12,000 feet the pilot descended to 5,000 feet, then landed the aircraft. The copilot was medevaced by helicopter to the local Army hospital. Recovery was uneventful. Food-related gastrointestinal upset may have been a contributing factor.

All three cases are classic descriptions of hyperventilation syndrome, a physiologic condition which results simply from breathing too fast. Because it can, as illustrated, result in total incapacitation and end in a catastrophic accident, all personnel should be familiar with its cause and mechanisms involved, and know how to prevent and treat it.

What happens in hyperventilation? Normally, oxygen (O_2) is transferred from the air into the blood and carbon dioxide (CO_2) from the blood into the air through the lungs so that a proper balance of these gases exists in the body. When there is a normal increase in breathing rate, e.g., during exercise, this balance is maintained because both O_2 utilization and CO_2 production are increased. If breathing is increased without a need for additional O_2, an excessive amount of CO_2 is eliminated through the lungs since additional CO_2 is not being produced. This occurs with deliberate voluntary overbreathing and with involuntary overbreathing due to hypoxia or to apprehension and anxiety. The latter can occur at sea

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level, is the most common, and may result in a vicious cycle as the effects of hyperventilation produce anxiety and anxiety in turn aggravates hyperventilation.

Above altitudes of 10,000 feet, hyperventilation can occur through a normal reflex mechanism if hypoxia (oxygen deficiency) develops because oxygen equipment is not used or if it is not functioning properly. This is the body's attempt to compensate for the diminished oxygen supply at higher altitudes. The end result is the same—excessive CO_2 is eliminated, the blood contains less acid (CO_2 and water combine in the blood to form H_2CO_3, carbonic acid) and the condition of alkalosis (the blood becomes more alkaline) develops. This triggers the sequence of events known as the hyperventilation syndrome.

The physiologic effects of alkalosis secondary to hyperventilation include decreased O_2 supply to brain tissue (in spite of rapid breathing) by interfering with normal use of oxygen by brain cells and decreasing blood flow to the brain through spasm of arteries which supply blood to the brain. This can eventually lead to unconsciousness, at which time the low CO_2 content of the blood affects the breathing center of the brain to slow breathing, CO_2 reaccumulates, the balance is restored, and the individual recovers—provided there has been no accident as a result of the incapacitation. It can be difficult to tell the difference between hyperventilation in its early stages and hypoxia since the former secondarily produces hypoxia of the brain. Both produce euphoria (a sense of well being), affecting judgment. Most people have a feeling of shortness of breath.

Alkalosis also causes irritability of nerves and muscles resulting in numbness and tingling sensations around the mouth and in the arms and legs, usually first noticed in the fingers and toes. Muscle control and coordination deteriorate and muscle spasms (cramps) also occur. In extreme cases where all body muscles are involved, the rigid, shaking, unconscious person may mistakenly be thought to be having a convulsion.

While alkalosis causes spasm of blood vessels supplying the brain, it has the opposite effect of dilating blood vessels to the rest of the body. If this becomes severe enough, the blood pressure drops and shock may result. Fortunately, in most instances, unconsciousness returns the breathing to normal before this happens (there may be a brief period of slower than normal breathing during recovery) and recovery is complete and uneventful.

How is hyperventilation prevented?

• Know and understand the psychological and physiological mechanisms of hyperventilation. Don't panic when early symptoms occur. Voluntarily control your breathing.

• Never fly when physically ill or fatigued or when under psychological stress.

• When flying above 10,000 feet, use supplemental oxygen provided by an adequate, well-maintained oxygen system.

What are the signs and symptoms of hyperventilation?

• A sense of euphoria.

• A feeling of shortness of breath, usually when there is no difficulty in breathing.

• Numbness and tingling of the extremities and around the mouth.

• Deterioration of muscle control and coordination.

• Mental confusion progressing to unconsciousness.

How is hyperventilation treated when it does occur?

• Voluntarily reduce the breathing rate when symptoms first appear. Don't give the cycle a chance to get started. If symptoms persist, land the aircraft (carefully, of course) at the nearest adequate airfield or landing zone before more serious problems develop.

• If symptoms occur at altitudes above 10,000 feet, give your oxygen system a PRICE check, descend to below 10,000 feet, and land as soon as possible. Since symptoms of hyperventilation may be confused with hypoxia, assume the latter until proven otherwise.

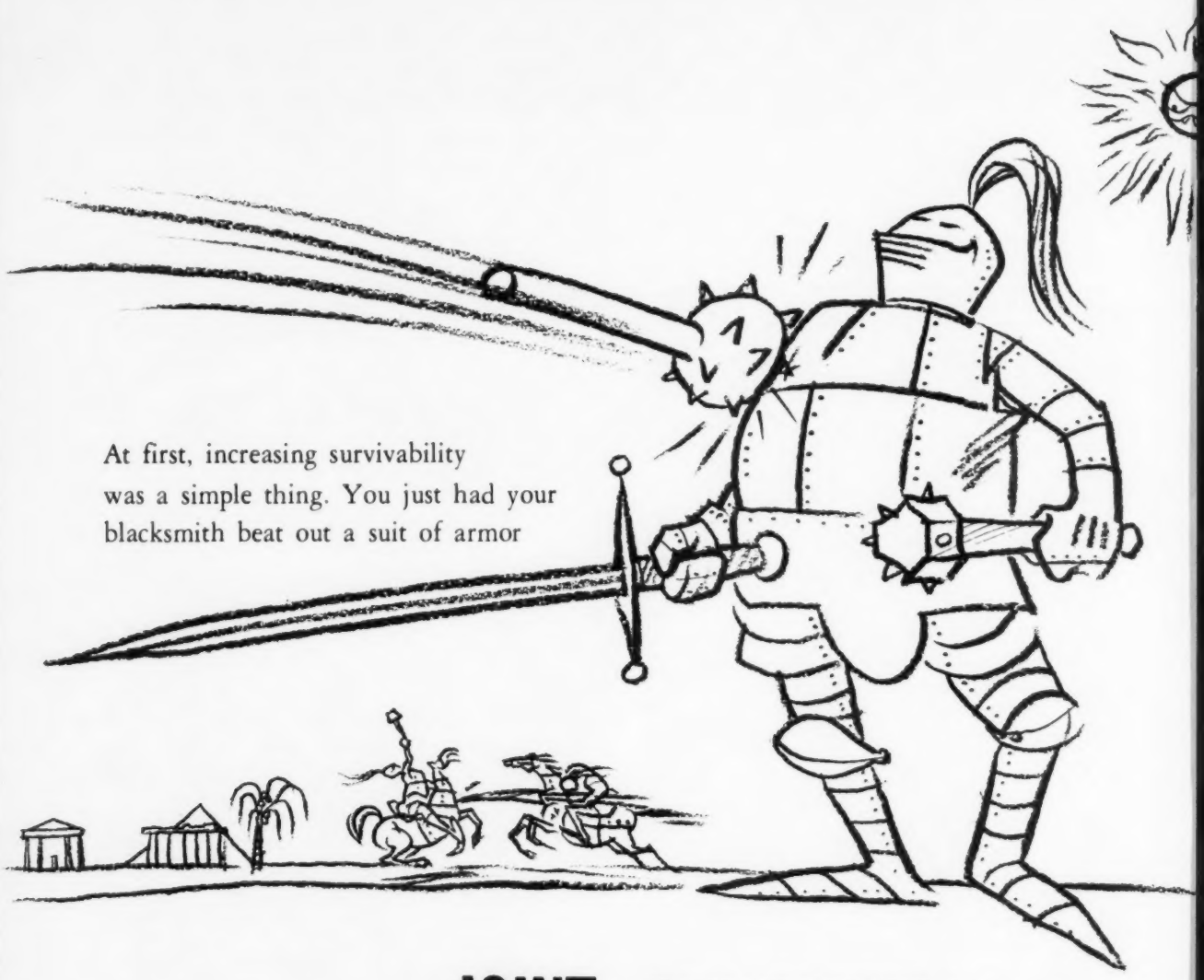
• Consult your flight surgeon after any suspected episode of hyperventilation or hypoxia.

• A quick and easy treatment for moderate symptoms is to have the individual breathe slowly into a paper bag held firmly over the nose and mouth until symptoms subside. Carbon dioxide will accumulate in the rebreathed air faster than oxygen is used and relief is usually rapid. If this procedure relieves the symptoms, it essentially confirms the diagnosis of hyperventilation syndrome.

• More serious cases obviously require medical attention.

It should be obvious from this discussion that hyperventilation is not to be taken lightly. It is not just a rare condition that develops at altitude when a sophisticated oxygen system goes on the blink. It can happen at any altitude. Be aware of its hazards.

How about making hyperventilation a topic for discussion at your next safety meeting? Better yet, corner your flight surgeon and have him review respiratory physiology for all your aircrewmembers in a special presentation. Someone's life, perhaps yours, may depend on it.



At first, increasing survivability was a simple thing. You just had your blacksmith beat out a suit of armor

JOINT TECHNICAL COORDINATING GROUP ON AIRCRAFT SURVIVABILITY

SINCE THE BEGINNING of time, commanders have recognized that if a man is going to survive in a hostile environment he is going to need more than just his courage. At first, increasing his survivability was a relatively simple thing. If he was a soldier on the battlefield you gave him a shield and a longer and stronger spear. If he was to be mounted on his trusty steed, then you simply had your blacksmith beat out a suit of armor for both him and his steed.

Then came the age of mechanization and the flying machine. Commanders had the eyes of the eagle, the mobility of the wind and the ability to strike in the heart of the enemy's homeland. But they soon found out, and so did the enemy, that the new-found bird of prey was fragile. If it was hit in any of its vulnerable areas, it would die. It could not survive in a hostile environment!

Again the solution was a simple one, or so it was

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thought. Call out the blacksmiths. Make a suit of armor for the man and his steed. However, the commanders soon learned that the simple "blacksmith approach" could not keep pace with weapons technology. As the blacksmith added boiler plate, the trusty steed lost its effectiveness.

In the early 1950s, the military services undertook intensive programs to improve the survivability of their aircraft. It was obvious that the "blacksmith approach" was not the solution. Each service utilized its aircraft in different missions and therefore faced different threats. As a result, each of the services ventured out in different directions to solve its survivability problems. These efforts were very productive and fostered many of today's design concepts. However, it also resulted in many duplications of research projects attempting to generate the required data base needed to design aircraft with better survivability qualities.

When the attrition rates of U.S. aircraft increased in the Southeast Asia conflict, the Joint Materiel/Logistic commanders decided to establish a tri-service organization to bring together the best expertise in each of the services to plan and execute a program to reduce the vulnerability of current fleet aircraft and to develop design criteria and improved technology to increase the survivability of future aircraft. The organization to conduct this program was designated the Joint Technical Coordinating Group on Aircraft Survivability (JTCG/AS). On 25 June 1971, the joint commanders signed the JTCG/AS charter. The charter outlined the JTCG/AS's purpose, which is to provide a mechanism to:

- Implement interservice efforts to reduce the vulnerability of aeronautical systems in a nonnuclear threat environment.
- Coordinate research and advanced development efforts which contribute to the reduction of aeronautical systems vulnerability.
- Maintain close liaison with service levels to ensure that all survivability research and development data and systems criteria are made available to the developers of new aircraft.

The JTCG/AS Central Planning and Management Office is located in Washington, DC, and is staffed by a representative from the U.S. Army Materiel Development and Readiness Command, Navy Materiel Command, Air Force Logistics Command and the Air Force Systems Command. In addition, more than 190 engineers have been made available by various laboratories within the tri-services to perform the technical R&D tasks. These engineers are assigned to six basic subgroups consistent with their area of expertise. These subgroups are:

- Technology Research and Development
- Design Criteria and Industry Interface
- Countermeasures
- Laser Effects
- Survivability Assessment
- Vulnerability Assessment

The activities of each subgroup are directed by a member of the central office. Overall direction and command guidance is provided by a steering committee composed of cognizant program and system managers in the tri-services.

The work in aircraft survivability R&D performed by the members of the JTCG/AS is world-renowned and the JTCG/AS has been recognized as one of the authorities in the field. At the present time, the JTCG/AS has 54 projects ongoing. These projects include work in the areas of fire and explosion suppression, fire extinguishment, airflow effects on fuel fires, hydraulic ram attenuation, missile warhead threat simulations, engine inlet duct modification, compartmented lubrication systems, armor design, damage tolerant materials, laser vulnerability, computer modeling and design criteria development, just to name a few.

Much of the work being conducted is applicable to other types of vehicles. After all, a fire aboard a ship or in an M-60 tank is just as serious as a fire aboard an aircraft. As a result, many other organizations benefit from the R&D efforts of the JTCG/AS. As a matter of fact, the work currently being conducted on fire-resistant hydraulic fluids will have extensive application throughout both the military and industry.

In addition to its work with the tri-services, the JTCG/AS is also actively involved with other government agencies and the general aviation industry. It is currently conducting joint projects with both the FAA and NASA. A hostile environment is not confined to just a combat zone. The recent crash of a commercial DC-10 after one of its engines ingested a flock of birds is firm evidence of that.

Where is all of this leading us? We have come a long way since the age of the "blacksmith approach" to aircraft survivability, but we still have a long way to go. We are now faced with a new generation of complex and sophisticated aircraft. The Army is looking at the UTTAS, ASH and AAH. The Navy is looking at the F-18 and the VMAX. And the Air Force is looking at the ATF and the AMST. A goal of the JTCG/AS and the cognizant program and systems managers is to design survivability into these aircraft while they are still on the drawing board. We have the technology, we have the expertise, and we have the need. That's a hard combination to beat!

Chaytor D. Mason

A noted psychologist, Chaytor Mason is a professor at the USAF Flight Safety Officers' School, University of Southern California, and an expert in the field of aviation psychology. A former Marine fighter pilot and currently a civilian pilot, he has taught aviation psychology to military aircrews for 14 years. Mr. Mason is a member of the American Psychological Association and is a registered clinical psychologist in the state of California. Mr. Mason also has a program called "Voice From the Colonies," which is presently being produced by the BBC in Great Britain.

From TAC ATTACK

SAFETY VERSUS MANHOOD

IN THE PAST 100 years, man has become able to control his environment and manipulate nature more than any previous 10,000-year period in his history. But in spite of all his technological advances, man knows little more about himself as a human being than he did 100 years ago. In fact, his knowledge about himself is, in many ways, not greatly advanced over his knowledge 1,000 years ago. His lack of knowledge of himself has produced some curious and dangerous predicaments.

Many of our concepts of man and his behavior no longer serve us in the world we live today. It has become obvious that mankind cannot survive by teaching children by untested methods passed from generation to generation. It has become obvious that we must subject man and his behavior to the same microscopic examination and exhaustive testing which advanced the knowledge of man's materials.

The subject of this article is one of man's behavior patterns—commonly accepted throughout history without question by millions of men. This concept, still alive today, is that manhood and safety are not compatible.

CASE STUDY: A group of 12- to 13-year-old boys are standing at the base of a high voltage powerline. They are arguing loudly, daring each other to climb to the top. Secretly, each one is afraid. Finally, one 12-year-old breaks from the group, quickly climbs to the top and waves triumphantly to the group below. As he waves, his arm touches the 55,000-volt line. There is a flash, he shudders and falls to the ground—dead!

CASE STUDY: The air is still and calm in this small coastal town. Fog has shrouded the airfield all night. The first flight of the day, Flight 54, a Convair, lets down into the fog. On his third approach, the pilot sights the runway and lands. Each approach was made below company and published minimums, but a successful landing was made.

Five minutes later another Convair, Flight 53, drones over the field. Radio contact is made with the passenger agent (who also serves as weather observer). Flight 53 is advised that the weather is well below minimums but that Flight 54 is on the ground and preparing to leave.

Flight 53 makes a VOR approach and pulls up after going 100 feet below the 390-foot minimums. On the second approach, 200 feet below minimums, ground witnesses can see the vague outline of the airplane as it pulls up again.

On the third approach, there is a sudden orange glow in the fog to the east as Flight 53 explodes through the roofs of three beach cottages at an altitude of 30 feet. Forty-one people die.

CASE STUDY: Due to a fuel system failure, an F-4 flames out at 18,000 feet near a desert Air Force base. The pilot is told he has too little altitude to make a safe approach, but he responds that he is unable to receive. He continues his approach. On touchdown, the main gear strikes the runway lip, but he makes it.

He receives a commendation for his superb handling of the emergency. In the next year, four more pilots try the same thing. Three fail to make it and six men die. One of the dead pilots was a lieutenant colonel, who, although older, was known for trying to keep up with whatever the younger pilots would do.

What is the common problem in all the accidents? The problem is SAFETY VERSUS MANHOOD.

It appears that many of us feel that looking after ourselves is a sign of cowardice. The 12-year-old could not say, "It looks dangerous as hell to me. I'm not going to climb up there." The pilot of Flight 54, who landed safely, knew that the pilot of Flight 53 would continue to make lower approaches until he got in, so he took three chances and made it. The copilot on Flight 53 died without a word. He could not express his fear to his captain, for in his mind, he would have seemed less of a man.

The problem of Safety versus Manhood can thus occur at any time, at any age, in any job, in any activity. Safety versus Manhood is one of the reasons why younger people have so many accidents in cars, in boats, in airplanes. It is one of the reasons why accidents are the greatest single cause of death in this age group. It is why younger people show so little caution. There seems to be one thing more important than safety—the proof of manhood.

Until we accept that it is masculine to consider and even plan for our own safety; to plan for *all* eventualities; to admit the possibility of accident—we men and leaders of men will laugh and scorn safety practices. It is important for management and training to make sure that the conflict between Manhood and Safety is resolved by coherent safety training. We must define the "Man" as the one who does the job professionally and does it safely. We must make sure there is no difference between safe operating policy and the way aircrews and support people actually perform. We must cut the imaginary lines between manhood and unnecessary risk.

SAFETY VERSUS MANHOOD

The following article on Safety versus Manhood was also written by Mr. Mason and appeared in an earlier issue of the AVIATION DIGEST.

One of the curious curses of our culture is the conclusion that anyone interested in his own safety is far too frightened to play the game well or give the job its fullest measure and therefore should be sacked on the spot.

This is a sad but realistic truth relating to man's own appraisal of manhood.

When it comes to "being a man," the average proud male cannot satisfy himself with buckling his biceps, or even by looking at the handsome progeny his seed had begotten.

Some secret spark of pride also directs that, should the occasion demand, the man will also be willing to conduct himself like an utter boob, disregarding all precautions—expressed or implied—in the performance of almost anything that will prove he isn't a sissy.

We lost a lot of good men that way.

And some of the characters classed as sissies, because they have at least a small regard for their own skins, manage handsomely to survive, live to see another day, and in the process contribute magnificently to the total goal.

This seems to be today's unsatisfactorily unsafe story of safety education—be it flight safety, highway safety, or even something as relatively minimal as household safety.

Let's flashback a few years: Baseball was born in Hoboken, N.J., in 1846. It was born a barehanded game. The first teams played with the same hard-rock ball used today. But the baseball glove hadn't been invented. Caught with bare hands, the ball broke hands and split thumbs. Not every catch was a lucky one.

And so it went along its maiming way for 25 years until, on one sunny day, Charlie White, first baseman for Boston and tired of sore hands, came onto the field wearing a thin, but nonetheless protective glove. He never got a chance to use it. He was laughed off the field with a chorus of catcalls: "If ya that scared of the ball, don't play." "Catch the ball; don't muff it."

Gloves were not worn on an American baseball diamond for another five years. And baseball went through the same time-trials in the evolution of a catcher's mask, a chest protector, and even today's hard hat.

Football, you will remember, fared no better in the development of "safety appliances." You may also recall that it has only been a few years ago when one of these bits of evidence for superior manliness was the cool defiance of a quarterback heaving his heavy helmet heavenward. Now there was a MAN who would lead the team to victory, the fans said.

No matter the game, the story has been essentially the same. You saw it in baseball, football, hockey, boxing—or that grimmest game of all—war.

Even in war the development of life-protecting headgear, garments, and even practices historically has been considered a vile form of cowardice—unmanly and unpatriotic!

Let's look at the record for a moment: In the American Revolution, the soldiers of his Britannic Majesty, George III, wore brilliant red coats and white pants and marched in bold, shoulder-to-shoulder formations against the sharpshooting guerillas of the day.

The Redcoats never really got the idea.

And about 140 years later the French Poilus and British Tommy Atkins were again marching off to war wearing crimson hats of cloth. Without so much as a change of uniform, they moved from the sidewalk cafes in Paris to the front.

With little more ado, they faltered and fell before the machine guns of the Germans—who happened to have been wearing very hard hats at the time.

Resistance to hard hats and the protection they afford was not necessarily a soldier-of-the-line idea. Despite directives from superiors, local commanders resisted trading off the bravado of the bright and soft hat for the dull steel helmet. One British commander went so far as to declare that anyone in his command who wore a hard hat would be court martialed on the spot for "cowardice in the face of the enemy."

It was just another case of a man trying to prove that he—and those in his command—weren't sissies and could firmly establish their manliness just by flaunting safety.

There are other stories and other examples and you can supply your own variations to the theme.

But the essence of it all is simply this: We can talk about safety as a hoped-for ideal. But we will not even go through the motions of doing things safely unless they do not disturb our own ideas of what is manly.

It also means that, unless we make some sweeping changes in our own thinking about safety and about its relationship—if any—to manliness and all the business of being a man, we will continue to have the same old disappointing safety statistics year after year—in the air, on the highway, even in the home.

In the field of aviation safety, we can expect that the accident rate for junior flying officers will continue high because there are "manly" young men who are trying to prove themselves. But the same rates may apply for those officers in their "dangerous forties" who are trying to reprove their manhood.

Probably we will arrive at no improvement at all, in the matter of safety until we reevaluate "manhood." First of all, this must be a personal reevaluation.

Is a MAN the one who runs headlong into a well-camouflaged machine gun nest knowing it means sudden death? Or is the real MAN the one who flanks the nest and throws in the destroying grenade?

Is a MAN the pilot who says, "give me a plane and point me toward the target" . . . or the one who says, "a flak vest and a hard hat will help me on this mission"?

Is a MAN the one who scoffs: "I'll fly through this front or bust my butt" . . . or the pilot who is willing to set for a spell, wait for the ugly weather front to pass, and then gets up there to deliver the goods?

It's a strange heritage which decrees we are MEN only when we disregard caution . . .

It will take a lot of education.

In the field of aviation safety, we can expect that the accident rate for junior officers will continue high because there are "manly" young men who are trying to prove themselves

briefs that teach

lowering ceiling

The flight initially consisted of two pilots and one aircraft. Their mission was to pick up another one of the unit's UH-1s located at a municipal airport, and then fly in separate aircraft to a field site. They were to leave one of the aircraft at the field site and return to home base in the other.

The two pilots departed home base and arrived at the pickup point. They remained overnight and departed for the field site in their separate aircraft the next morning. They landed at an airfield near the field site, and a flight plan was filed for the field where the aircraft was to be left.

Both aircraft departed fully fueled for the VFR flight to the field site in a loose trail formation. A mountain range ran perpendicular to the line of flight. As they began crossing the first series of ridges they could see the next and succeeding ridges some 10 to 15 miles ahead of them. Visibility was good and only a stratus layer of scud presented any restriction to VFR flight.

Helicopter minimums were maintained for the first 25 to 30 miles and it appeared that the flight could be accomplished without incident. However, as they approached the final ridgeline, the first aircraft crossed the ridge safely but the pilot in the trail aircraft ran into lowering ceilings caused by scud blowing in from atop the ridge to the north. The second pilot penetrated this thin layer of stratus and went IFR for several seconds. When he exited the thin cloud at approximately 70 knots, he saw a tree in his line of flight. A rapid cyclic climb with immediate application of power was initiated but the closure rate was too rapid and the main rotor blade struck the tree. No damage was felt through the controls and the pilot proceeded to the field site 3 to 4 miles to the north and landed.

The disregard for the lowering cloud ceiling and poor judgment in maintaining cruise airspeed under the conditions encountered caused this $80,000 accident. The flight leader should have aborted the mission when weather in the mountainous area approached what appeared to be marginal VFR conditions. He is responsible for all aircraft under his supervision. In clearing the ridgeline himself, he had the responsibility to ensure that his trail aircraft could also negotiate the flight plan route without difficulty.

USAAAVS

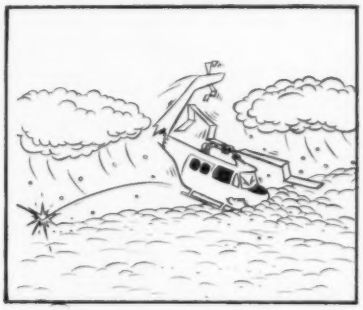
no weather info

A UH-1H was on a resupply mission. After staying on the ground for about 1 hour, the crew took off for the return trip home. Shortly after takeoff, the aircraft struck the ground on a 7-degree upslope. It then rebounded in line for 630 feet where it impacted a second time on a 10-degree slope. The aircraft was destroyed and the pilot, copilot and five passengers were injured.

The weather at the time of the accident was ceiling indefinite, less than 100 feet obscured, visibility less than 25 meters, snow and blowing snow, wind estimated 120 degrees at 35 knots, gusting to 55 knots, and possibly higher. VFR helicopter operations over mountainous terrain calls for 1,000 feet ceiling over the highest obstacle along the flight route and 1-mile visibility. Wind limitations, generally speaking, define a maximum velocity of 30 knots and a maximum gust spread of 15 knots.

The pilot did not obtain current en route, destination and alternate weather information before take-off. He failed to recheck weather after spending 1 hour on the ground in a location with already marginal weather. He took off realizing that he would most likely encounter IFR conditions of unknown intensity while on a VFR local flight plan. While at destination he could have contacted home station facilities via radio. Had he done so, he would have realized that conditions were such that compliance with visual flight rules was impossible.

The high winds and poor visibility were direct and major causes of the aircraft being off course, traveling at excessive speed, and ultimately being out of control and crashing.



too close

The mission was to fly sorties from a pickup zone (PZ) northeast of the airfield to a landing zone (LZ) southeast of the airfield on top of a ridgeline as part of an airmobile assault training exercise. After unloading troops, the lead UH-1 was to depart the ridgeline, fly around a mountain to the northwest and return to the PZ.

Takeoff was made on time and the flight went as planned. According to the copilots of Chalk 2 and Chalk 3, the pilot of Chalk 2 had difficulty holding a respectable formation from the PZ to the LZ. On final, after the flight changed formation to right echelon, the copilot thought the pilot was too close to Chalk 1. The pilot moved even closer to the lead aircraft just before touchdown. The crew chief told the pilot several times that they were too close and to move right. The copilot repeated the warning.

After the troops were off, Chalk 2 was brought to a hover and instead of sliding right to ensure separation before takeoff, the aircraft was brought to a hover and the blades of the two aircraft meshed.

The cause of this major accident is clear: the lack of judgment on the part of the pilot of Chalk 2 in selecting a landing position unnecessarily close to the other aircraft. He also failed to respond to several warnings by the crew chief and the copilot to move away from the other aircraft.

Supervisory error was also a factor in that two aviators were placed in the same aircraft, neither of whom met the qualifications for pilot-in-command according to supplement 1 to AR 95-1.

USAAAVS

PEARL'S

Personal Equipment & Rescue/Survival Lowdown

If you have a question about personal equipment or rescue/survival gear, write Pearl, USAAAVS, Ft. Rucker, AL 36362

AN/PRC-90 Radio Set

The following information was received from the U.S. Army Electronics Command, Ft. Monmouth, NJ:

The next change to TM 11-5820-800-12, 30 November 1973, will include the following. Page 3-6, paragraph 3-7a, is changed to read:

a. Operation of the AN/PRC-90 will span a wide range of weather extremes. Although the AN/PRC-90 circuits are operable over a temperature range of −30° to +50° C. (−22° to +122° F.), the battery (BA-1568/U) power supply is only effectively operable over a 0° to +54° C. (+32° to +129° F.) temperature range. Operating at low temperatures reduces battery life. The AN/PRC-90 (less the battery) may be stored over a temperature range of −60° to +60° C. (−76° to +140° F.).

The following note is to be added after paragraph 3-7c:

When operational conditions using battery BA-1568/UR include temperatures below 50° F., the radio set and spare battery should be carried inside flight clothing to prevent cold soaking. The battery will not supply sufficient power to operate the radio if permitted to cold soak for extended periods of time at freezing or below temperatures. Therefore, the user should initiate use of radio at low temperatures with a battery that has been warmed. Batteries should be rewarmed as soon as possible after use to ensure reliable operation of the radio. The following exposure times of the battery at the temperatures indicated are recommended:

Temperature (°F)	Cold Soak Time
Plus 32°	30 minutes
0°	15 minutes
Minus 40°	5 minutes

Helmet Bag

Would you tell me where I can obtain a supply of Bag, Flying Helmet, Nylon, NSN 8415-00-782-2989, for our police department.

This item is available from the Defense Personnel Support Center, ATTN: TSK, 2800 South 20th Street, Philadelphia, PA 19101. You should contact Mr. Stapler, Requisition Processing Section, telephone (215) 271-3013. He will give you details on how to negotiate the purchase transaction.

Repair of Nomex Jackets

Numerous complaints are being received concerning the cuffs/wristbands of the new Nomex flyer's jacket, NSN 8415-00-217-7220, unraveling after as little as two weeks' wear. Action is being taken by Defense Personnel Support Center to correct this deficiency.

Repair items are available as outlined:

Cuffs/Wristbands	NSN 8315-00-275-2870
Waistbands	NSN 8315-00-275-6195
Nomex Thread	NSN 8310-00-492-8397

The above are S9T items and can be requisitioned from Defense Personnel Support Center (DPSC), Director of Clothing and Textiles, Philadelphia, PA 19101. Request problems be reported to Mr. A. B. C. Davis, USAAVSCOM, ATTN: DRSAV-WL, P. O. Box 209, St. Louis, MO 63166, AUTOVON 698-3241/3291.

Nomex Shirt

I am sending you a Nomex shirt that was issued to a crew chief in my unit. The shirt is a good example of the type equipment that is being repaired and reissued. If you will examine the shirt you will note several discrepancies, such as holes repaired with other than Nomex thread, snaps that do not have Nomex backing, and snaps that do not snap.

This shirt was forced upon the crew chief. Now he has this unserviceable shirt which he cannot safely use for flight.

Thank you for advising us of this problem area. We plan to have the shirt evaluated at both the U. S. Army Aeromedical Research Laboratory (USAARL) at Ft. Rucker, AL, and at Natick Development Center, Natick, MA. Based on the results of their critical examinations, we will take appropriate action.

A cursory examination by USAAAVS and USAARL personnel indicated that there were several problems readily identifiable with the shirt, confirming statements in your letter. Additionally, Change 7, TM 10-8400-201-13, does not allow substitute materials to be used in the repair of this uniform and there is no collar closure on the shirt.

This shirt is considered by USAAAVS to be unserviceable and we will dispose of it locally. You may wish to account for this item under the provisions of AR 735-11, using DD Form 200 (Report of Survey) or DA Form 444 (Inventory Adjustment Report).

We will advise you of evaluations made and further action indicated.

MG James C. Smith

HAIL and FAREWELL

MG William J. Maddox Jr.

Major General William J. Maddox Jr. has retired from the U.S. Army. To him we say, "Good luck in your retirement." Major General James C. Smith succeeds General Maddox as commander of the Aviation Center. To him we say, "Welcome to Fort Rucker." Both General Maddox and General Smith are "long time" Army aviators, receiving their wings shortly after World War II. Both Master Army Aviators were inducted into the Army Aviation Hall of Fame last month

MAJOR GENERAL James C. Smith became commander of the U.S. Army Aviation Center this month. He succeeds Major General William J. Maddox Jr., who retired from the Army on 30 June.

General Smith is 52 years old and was born at Fort Oglethorpe, GA. For the past 14 months he has been Chief of Staff, Eighth U.S. Army, United States Command, U.S. Forces, Korea.

This will be the second tour at Fort Rucker for General Smith. He was a special projects officer at the post with the Combat Developments Command Aviation Agency from October 1965 to January 1966. He also was closely associated with the post's mission when he commanded the Army Flight Training Center at Fort Stewart, GA, from August 1970 to March 1971.

General Smith enlisted in the Army in June 1942. Three months later he went to the Cavalry School at Fort Riley, KS, for officer candidate training and was commissioned as a second lieutenant in January 1943.

His association with Army aviation began when he received his initial aeronautical rating as a Liaison Pilot (fixed wing) from the Artillery School, Fort Sill, OK, in November 1947. He later trained as a helicopter pilot and is now a Master Army Aviator.

One of his major aviation assignments was with the Joint Test and Evaluation Task Force, U.S. Strike Command, McDill Air Force Base, FL. That mission included the test and evaluation of the 11th Air Assault Division which was later to become the 1st Cavalry Division (Airmobile).

In December 1965 he was assigned to the Republic of Vietnam as executive officer and later commander of the 1st Cavalry Division (Airmobile) Support Command. The following May he became commander of the 1st Squadron, 9th Cavalry, 1st Cavalry Division, at that time the Army's only air cavalry squadron. General Smith finished that tour in Vietnam in April 1967 as commander of the division's 1st Brigade (Airborne).

He returned to duty in Vietnam in August 1968 as deputy commander of the 1st Aviation Brigade. In March 1969 he became assistant commander of the 101st Airborne Division, a position he held until he moved to Fort Stewart.

General Smith was commander of the 1st Armored Division and later the 1st Cavalry Division* at Fort Hood, TX, from March 1971 to January 1973.

He assumed the position as deputy commander of Fifth U.S.Army Reserve Forces Northern Area, and commander, Headquarters, Fifth U.S. Army Coordinating Element Northern Area, in January 1973. He became commander of Headquarters, U.S. Army Readiness Region V in July 1973.

General Smith is a graduate of the University of Omaha (Nebraska) and the Army War College, Carlisle Barracks, PA.

His awards and decorations include the Distinguished Service Medal with Oak Leaf Cluster, Silver Star with Oak Leaf Cluster, the Legion of Merit with Oak Leaf Cluster, Distinguished Flying Cross with three clusters, the Bronze Star Medal with Oak Leaf Cluster and the Air Medal with 62 clusters.

*During this period the 1st Cav was a TRICAP (triple capability) division.

AFTER 34 YEARS of service in the U.S. Army, Major General William J. Maddox Jr., has retired. He has been the commander of the U.S. Army Aviation Center since September 1973 and retired on 30 June.

When General Maddox arrived at the Army Aviation Center, the development of doctrine and hardware—and courses being taught—were directed toward equipping the helicopter pilot to fight in the relatively unsophisticated war being fought in the Republic of Vietnam. But infrared air defense weapons were being introduced even while the war was winding down and a shift to a more sophisticated method of fighting was necessary.

General Maddox reorganized the Center and changed the Vietnam era preconceptions and prejudices to ensure that Army aviators would be prepared to fight and win on today's high threat battlefield. He blended airmobile concepts that began budding at the Aviation Center in the mid-1950s with lessons learned in Vietnam and the 1973 Mideast War. He used them as a springboard to turn the direction of the Aviation Center and develop the staying power, firepower and willpower to help the combat arms win the first battle of the next war.

In June 1942 General Maddox enlisted in the horse cavalry and was commissioned from the Infantry Officer Candidate School in 1944. He served in the mechanized cavalry in VII Corps and was rated an Army Liaison Pilot with the second class of ground force officers to receive pilot training after World War II.

He served in the Philippines and Japan from 1946 to 1950 and landed with the First Cavalry Division in Korea in 1953 as aide-de-camp and helicopter pilot to General Bruce C. Clarke.

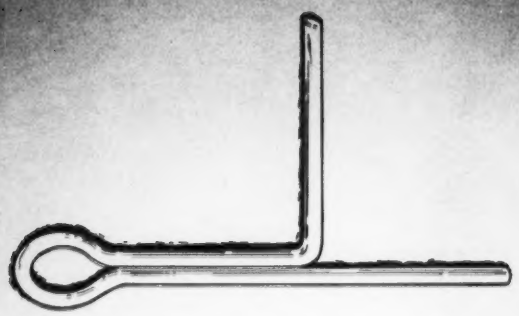
After two years of command of the Military Assistance Advisory Group-Japan Flight Detachment, he rejoined General Clarke who was then commander of the Seventh Army in Germany. He served on the Czechoslovakian-East German border with the Second Cavalry Regiment and from there went to the Command and Staff College.

While serving as a plans officer on the Army General Staff, he spearheaded the presentation of Army aviation requirements to the scientific and industrial communities and was key to the development of the Army's positions concerning service responsibilities and aviation roles and missions. He also was instrumental in developing a management structure necessary to achieve Army aviation objectives.

After receiving a Master's degree in international relations at the National War College, he went to Vietnam to command the 13th Combat Aviation Battalion. While under his leadership the 13th was recognized three times for valor. Upon promotion he became the senior advisor of the Vietnamese 21st Infantry Division. In June 1967, he became the Chief of Staff of the 3rd Armored Division, Frankfurt, Germany.

In May 1969, he returned to Vietnam to become commanding officer of the 3rd Brigade, 25th Infantry Division where his perception of airmobile tactics was reflected in numerous successful engagements. He next commanded the 164th Aviation Group in Vietnam where he was responsible for more than 500 combat aircraft. In September 1970, he became Director of Army Aviation, Department of the Army. While in Washington he was instrumental in development of the advanced attack helicopter and utility tactical transport aircraft system programs and was the driving force behind the establishment of the Army's worldwide aviation standardization program.

General Maddox' awards include the Silver Star with three clusters, Legion of Merit with four clusters, Distinguished Flying Cross with seven clusters, Soldiers Medal, Bronze Star Medal with V and three clusters, Air Medal with V and 127 awards, the Purple Heart with three clusters and the Presidential Unit Citation. He is qualified in both rotary and fixed wing aircraft and holds the Combat Infantry Badge and the Master Army Aviator Badge. He has logged more than 10,500 flight hours with 4,000 being combat time.



LET ME SEE IT

Ever notice the reaction of a man being shown a hot item—like the promotion list, for instance? Chances are that after you've shown it to him—he looked—read—yet snatched it from your hand and said, "Let me see it." What he meant was—let me feel it. He wanted to confirm with another of his senses that he did in fact see it. He wanted to be sure.

This brings us to the point we'd like to make. How often have you, even after a second look decided to feel for a cotter pin to make sure it was in place? From experience we know that complex arrangements of push rods, links and bellcranks tend to blend together as one color. This situation coupled with eye strain makes the possibility of overlooking the elusive cotter pin even greater.

As in the case of the promotion list, when it comes to checking cotter pin installation—make sure you "SEE" it—feel it.

Grumman Poop Sheet.